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University of California
Berkeley, California

Western Mining in the Twentieth Century
Oral History Series

Evan Just

# GEOLOGIST: ENGINEERING AND MINING JOURNAL, MARSHALL PLAN, CYPRUS MINES CORPORATION, AND STANFORD UNIVERSITY, 1922-1980

With introductions by

Noel Kirshenbaum
James K. Richardson

Interviews Conducted by
Eleanor Swent
in 1989

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Since 1954 the Regional Oral History Office has been interviewing leading participants in or well-placed witnesses to major events in the development of Northern California, the West,and the Nation. Oral history is a modern research technique involving an interviewee and an informed interviewer in spontaneous conversation. The taped record is transcribed, lightly edited for continuity and clarity, and reviewed by the interviewee. The resulting manuscript is typed in final form, indexed, bound with photographs and illustrative materials, and placed in The Bancroft Library at the University of California, Berkeley, and other research collections for scholarly use. Because it is primary material, oral history is not intended to present the final, verified, or complete narrative of events. It is a spoken account, offered by the interviewee in response to questioning, and as such it is reflective, partisan, deeply involved, and irreplaceable.

************************************

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Stanford Report

February 4, 1998

# Evan Just, emeritus professor of mineral sciences, dies at

BY JANET BASU

Evan Just, professor emeritus and former head of the Department of Mineral Sciences at Stanford, died at his home in Menlo Park on Jan. 22 of congestive heart failure. He was 97.

An influential figure in mining and petroleum engineering before he joined the Stanford faculty in 1959, Just was known for his straightforward honesty and his humility, colleagues say. In addition to work in petroleum and mining exploration, he served as director of the Strategic Materials Division for the post-World War II Marshall Plan, and served for a decade as editor-in-chief of *Engineering and Mining Journal*, one of the industry's oldest and most influential publications.

Just was born in Chicago on Sept. 18, 1900, the son of Nober and Selma Gottlieb-Just. His father was a Danish-born tea merchant who took the 12-year-old Evan along on one of his annual business trips to pre-Westernized Japan. Just earned his bachelor's degree in geology from Northwestern University in 1922, his master's from the University of Wisconsin in 1925 and an honorary doctorate from the Montana School of Mines in 1954. In his twenties, he served as geologist for midwestern oil and minerals companies, with time off for bauxite exploration in post-revolutionary Russia and an investigation of emerald deposits in Brazil. He was briefly drawn into academe – teaching at Lehigh University and the New Mexico School of Mines – before returning to industry, first as an oil company geologist, then as executive secretary of a mining trade association. He was editor of *Engineering and Mining Journal* from 1942 to 1952 and subsequently served as exploration vice president of Cyprus Mines Corp.

As an editor and industry representative, Just held the mining industry to high standards. In awarding him the degree of Doctor of Engineering, the Montana School of Mines honored him for encouraging the industry worldwide "to adopt the best technical methods, to improve its public and industrial relations, and to adopt more aggressive and progressive programs of search for mineral deposits." In 1989, when he recorded an oral history for the Bancroft Library, Just expressed pride in programs to protect miners from silicosis. He was actively interested in pollution problems related to minerals and petroleum.

He also campaigned for management training for mining engineers and technical personnel. At Stanford, he arranged for graduate degree candidates in mineral engineering to take classes in the Graduate School of Business. Under his leadership, Stanford developed a curriculum in mineral economics, combining the science and engineering necessary to find minerals with study of the economic and political factors that would make them feasible to produce. "That course was the reason I came back to Stanford for an Engineer of Mines degree," said Noel Kirshenbaum (B.S. '56, M.S. '57, E.M. '68), who wrote his graduate thesis under Just's guidance and became a life-long friend.

Just was recruited to Stanford in 1959 after a nationwide search, specifically to build a department of mineral engineering; when his appointment was announced, letters from top executives at nearly a dozen major mining companies praised Dean Charles Park for the choice. "For a while, we were a department of two," recalled George Parks, who joined the faculty the same year as assistant professor. By the time Just took emeritus status in 1966, the department had only three faculty, but the number of students enrolled each year had grown from four to almost 20. Just continued to reach courses throughout the 1970s and remained active as a consultant to industry for many years.

Parks recalled Just as "a wonderful mentor, for young faculty as well as students." Kirshenbaum said friends have speculated that one reason Just lived so long was that he never got irritated at people or situations. "The thing that shone through all the time was his absolute honesty. He spoke his mind even if what he said was controversial," Kirshenbaum said.

Just is survived by his daughter and son-in-law, Karen and Harry Penhasi of Nevada City, Calif.; grandchildren Toni Bedal of San Jose, Mimi Meyer of Menlo Park and Evan Penhasi of San Francisco; and great-grandson Drew Bedal.

Karen Penhasi recalled her father as a modest man who refused a long list of honors and prizes offered to him; he only agreed to be interviewed for his oral history when Kirshenbaum's wife, Sandra, persuaded him that it was historians' task and not his own to decide if his recollections of 20th-century mining history were worth recording. One story that does not appear in the oral history occurred when Just was a student and competitive swimmer at Northwestern: He swam under the ice of frozen Lake Michigan to reach a boy who had fallen into the water. A newspaper report recounts that Just nearly died in the attempt, but he only said, "It was nothing. I'm only sorry I found the lad too late."

"That was my father – that humility," Penhasi said.

Memorial services for Just will be private. Penhasi said that flowers or donations would have embarrassed her father; however, if friends do wish to make donations in his memory, she suggested the Mid-Peninsula Hospice, headquartered in Mountain View, Calif. SR

NEWS SERVICE FILES

UNDER EVAN JUST'S LEADERSHIP, Stanford developed a curriculum in mineral economics, combining the science and engineering necessary to find minerals with the study of economic and political factors that would make them feasible to produce. The photo was taken in 1967.

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EVAN JUST
1952

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1990, xiv, 144 pp.

Education, Northwestern University, University of Wisconsin. Work with petroleum, Oklahoma; emeralds, Brazil; bauxite, U.S.S.R.; lead-zinc, southeast Missouri; editor, Engineering & Mining Journal; director, Strategic Minerals Division, Economic Cooperation Administration (Marshall Plan); vice president, Cyprus Minerals Company; professor, mineral economics, Stanford University.

Introductions by Noel Kirshenbaum, manager, mineral products development, Placer Dome U.S. Inc.; James K. Richardson, president emeritus, Arizona Mining Association.

Interviewed 1989 by Eleanor Swent for Western Mining in the Twentieth Century series. The Regional Oral History Office, The Bancroft Library, University of California, Berkeley.

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# PREFACE

The oral history series on Western Mining in the Twentieth Century documents the lives of leaders in mining, metallurgy, geology, education in the earth and materials sciences, mining law, and the pertinent government bodies. The field includes metal, non-metal, and industrial minerals, but not petroleum.

Mining has changed greatly in this century: in the technology and technical education; in the organization of corporations; in the perception of the national strategic importance of minerals; in the labor movement; and in consideration of health and environmental effects of mining.

The idea of an oral history series to document these developments in twentieth century mining had been on the drawing board of the Regional Oral History Office for more than twenty years. The project finally got underway on January 25, 1986, when Mrs. Willa Baum, Mr. and Mrs. Philip Bradley, Professor and Mrs. Douglas Fuerstenau, Mr. and Mrs. Clifford Heimbucher, Mrs. Donald McLaughlin, and Mr. and Mrs. Langan Swent met at the Swent home to plan the project, and Professor Fuerstenau agreed to serve as Principal Investigator.

An advisory committee was selected which included representatives from the materials science and mineral engineering faculty and a professor of history of science at the University of California at Berkeley; a professor emeritus of history from the California Institute of Technology; and executives of mining companies.

We note with much regret the death of two members of the original advisory committee, both of whom were very much interested in the project. Rodman Paul, Professor Emeritus of History, California Institute of Technology, sent a hand-written note of encouragement just a few weeks before his death from cancer. Charles Meyer, Professor Emeritus of Geology, University of California at Berkeley, was not only an advisor but was also on the list of people to be interviewed, because of the significance of his recognition of the importance of plate tectonics in the genesis of copper deposits. His death in 1987 ended both roles.

Thanks are due to other members of the advisory committee who have helped in selecting interviewees, suggesting research topics, and raising funds.

Unfortunately, by the time the project was organized several of the original list of interviewees were no longer available and others were in failing health; therefore, arrangements for interviews were begun even without established funding.

The project was presented to the San Francisco section of the American Institute of Mining, Metallurgical, and Petroleum Engineers (AIME) on "Old-timers Night," March 10, 1986, when Philip Read Bradley, Jr. was the speaker. This section and the Southern California section provided initial funding and organizational sponsorship.

The Northern and Southern California sections of the Woman's Auxiliary to the AIME (WAAIME), the California Mining Association, and the Mining and Metallurgical Society of America (MMSA) were early supporters. Several alumni of the University of California College of Engineering donated in response to a letter from Professor James Evans, the chairman of the Department of Materials Science and Mineral Engineering. Other individual and corporate donors are listed in the volumes. The project is ongoing, and funds continue to be sought.

Some members of the AIME, WAAIME, and MMSA have been particularly helpful: Ray Beebe, Katherine Bradley, Henry Colen, Ward Downey, David Huggins, John Kiely, Noel Kirshenbaum, and Cole McFarland.

The first five interviewees were all born in 1904 or earlier. Horace Albright, mining lawyer and president of United States Potash Company, was ninety-six years old when interviewed. Although brief, this interview will add another dimension to the many publications about a man known primarily as a conservationist.

James Boyd was director of the industry division of the military government of Germany after World War II, director of the U.S. Bureau of Mines, dean of the Colorado School of Mines, vice president of Kennecott Copper Corporation, president of Copper Range, and executive director of the National Commission on Materials Policy. He had reviewed the transcript of his lengthy oral history just before his death in November, 1987.

Philip Bradley, Jr., mining engineer, was a member of the California Mining Board for thirty-two years, most of them as chairman. He also founded the parent organization of the California Mining Association, as well as the Western Governors Mining Advisory Council. His uncle, Frederick Worthen Bradley, who figures in the oral history, was in the first group inducted into the National Mining Hall of Fame, Leadville, Colorado, in 1988.

Frank McQuiston, metallurgist, vice president of Newmont Mining Corporation, died before his oral history was complete; thirteen hours of taped interviews with him were supplemented by three hours with his friend and associate, Robert Shoemaker.

Gordon Oakeshott, geologist, was president of the National Association of Geology Teachers and chief of the California Division of Mines and Geology.

These oral histories establish the framework for the series; subsequent oral histories amplify the basic themes.

Future researchers will turn to these oral histories to learn how decisions were made which led to changes in mining engineering education, corporate structures, and technology, as well as public policy regarding minerals. In addition, the interviews stimulate the deposit, by interviewees and others, of a number of documents, photographs, memoirs, and other materials related to twentieth century mining in the West. This collection is being added to The Bancroft Library's extensive holdings.

The Regional Oral History Office is under the direction of Willa Baum, division head, and under the administrative direction of James D. Hart, director of The Bancroft Library.

Interviews were conducted by Malca Chall and Eleanor Swent.

Willa K. Baum, Division Head
Regional Oral History Office

Eleanor Swent, Project Director
Western Mining in the Twentieth
Century Series

May 1, 1988
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Mr. Langan W. Swent
Vice President (retired), Homestake Mining Company

* Deceased during the period of the project

## Western Mining in the Twentieth Century Oral History Series
## Interviews Completed or in Process, January 1990

Horace Albright, *Mining Lawyer and Executive, U.S. Potash Company, U.S. Borax, 1933-1962*, 1989

James Boyd, *Minerals and Critical Materials Management: Military and Government Administrator and Mining Executive, 1941-1987*, 1988

Philip Read Bradley, Jr., *A Mining Engineer in Alaska, Canada, the Western United States, Latin America, and Southeast Asia*, 1988

Catherine C. Campbell, *Ian and Catherine Campbell, Geologists: Teaching, Government Service, Editing*, 1989

Helen R. Henshaw, *Recollections of Life with Paul Henshaw: Latin America, Homestake Mining Company*, 1988

Lewis L. Huelsdonk, *Manager of Gold and Chrome Mines, Spokesman for Gold Mining, 1935-1974*, 1988

Evan Just, *Geologist: Engineering and Mining Journal, Marshall Plan, Cyprus Mines Corporation, and Stanford University, 1922-1980,* 1989

Frank Woods McQuiston, Jr., *Metallurgist for Newmont Mining Corporation and U.S. Atomic Energy Commission, 1934-1982*, 1989

Gordon B. Oakeshott, *The California Division of Mines and Geology, 1948-1974*, 1988

Samuel S. Arentz, Jr. (Escalante Mine), in process
James T. Curry, Sr. (Calaveras Cement Company), in process
Donald Dickey (Oriental Mine), in process
James M. Gerstley (U.S. Borax), in process
George Heikes (tungsten, zinc), in process
A. I. Johnson (Black Hills mining), in process
Plato Malozemoff (Newmont Mining Corporation), in process
Langan Swent (San Luis, Homestake, uranium mining), in process

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## INTRODUCTION by Noel W. Kirshenbaum

Although virtually a quarter century has passed since I first met Evan Just, my recollection of that meeting with him is uncommonly clear, for it was immediately evident that is was an uncommon man who was facing me across his desk at Stanford University in 1966. I perceived him at once to be a candid and objective person, outspoken without being opinionated. That judgment has never been diminished.

Evan has had the advantage of a wonderfully full life of experiences, with varied accomplishments in industry, journalism and academia, so his perspectives are enhanced by the wealth of fascinating activities of which he has either been a part or been a shrewd observer. Despite his achievements, Evan is so modest that for a long time he was unwilling to have his oral history recorded, insisting repeatedly that his career was not worth writing about. It was ultimately my wife who was able to make use of Evan's own modesty to overcome his resistance, arguing that he should just let The Bancroft Library be the judge of whether or not his story was worthwhile. Fortunately he was not as stubborn as he was modest, and on those terms he finally acquiesced. Thus we have this valuable addition to the literature of the mining industry.

Not having known him at the time when he was editor of the E&MJ, I have wondered if it was that experience which provided him with the faculty of speaking slowly and deliberately, almost as though he were composing an editorial or a column which had to reflect accurately a situation and would need no changes once it had been transcribed. As this oral history attests, a conversation with him today can provide hours of detailed information on any number of commodities, companies, countries, and interesting people and events.

In my opinion, Evan's breadth of skills is exemplified by his role as mineral economist. Though not a common vocation, mineral economics often appears to be self-taught, as it combines technical talents in the mineral industry with experience one obtains in the broad world of commerce. To his great credit, Evan was able to create a new curriculum in this field at Stanford, incorporating Earth Sciences and the Graduate School of Business. I recall that this was achieved with some difficulty, as the Business School was reluctant to set a precedent and open its doors to students from other departments of the university. Students, myself included, came from literally every continent to take advantage of the unique interdisciplinary program which Evan Just had established in Mineral Engineering and Mineral Economics.

As his friend, I have enjoyed conversing with him over the years, and it is rewarding to know that he has favored posterity, as well, with this volume of his crisp recollections.

Noel W. Kirshenbaum
Manager, Mineral Projects Development
Placer Dome U.S. Inc.

12 February 1990
San Francisco, California

## Introduction by James K. Richardson

It is perplexing to go about briefly introducing a person whom I have publicly professed to "love like a brother;" acknowledged to be my most outstanding teacher; one of my most kind and caring neighbors; and the rock whose steadying hand kept me from stumbling too often to ever fully acknowledge. I have always known that he wanted no flowery superlatives--his humility enjoins such--yet even now I wonder now it can be avoided when considering his influence upon me as an individual.

I can only speculate as to how Mrs. Swent overcame his modesty and persuaded him to sit for this self portrait. I recall so well how in the late 1960s he and Thayer Lindsay were nominated for the Mining and Metallurgical Society's gold medal; Evan Just wrote and asked that his name be withdrawn from further consideration!

I first met Evan Just in October, 1941 in San Francisco at an American Mining Congress annual meeting. I had been asked to give a paper relative to the accident prevention and industrial hygiene program of the Climax Molybdenum Company, my employer. My views and those of Evan must have coincided for after the meeting he introduced himself, said the usual nice things one must, and told me of the work his employer, the Tri-State Zinc and Lead Ore Producers, had done and were doing in the same general area. We exchanged cards, promised to exchange information--and in the intervening years, almost fifty of them, we have been faithful correspondents.

Evan in early 1942 joined the staff of the Engineering and Mining Journal, succeeding Harry Chelson, who had left to become editor of The Mining Congress Journal. Before Evan's conscience would permit him to leave his old job he sought a replacement, which position he offered to me, and I accepted. I arrived in Miami, Oklahoma and he had arranged for me to rent his former home. When I reported to my Picher office I was on my own, a babe in the woods and feeling every bit of it, for I had only a limited idea as to what was expected of me. Evan introduced me as "my friend" which I later found to be a blessing. He promised to monitor my work by telephone and letter over the intervening weeks to prevent me falling completely on my face--and he did. The members of the Tri-State Association were rugged individualists, kind and helpful to Evan's friend, and intensely loyal to the district and one another. I love them all! It was under such an umbrella that I began to feel this eternal debt that I owe Evan Just.

Evan, an extremely articulate, intelligent, and experienced young man, fit easily into his new job--at least I thought so. I was initially a bit apprehensive about succeeding him, but on Evan's periodic returns to the district to look over his farm where he raised Black Angus cows, he made it a point to spend almost as much time with me as with his cows. I often thought they needed a mentor more than I, for my "pasture" was becoming wonderful.

The operators in the Tri-State District had an almost legendary luncheon every Wednesday at noon. This gastronomic delight, even though a bit heavy, was very tasty. Unlike most service clubs, few members failed to show up on time to share the period of conviviality and inimitable food. Membership was limited and highly esteemed. One noon, a member in his cups reported receiving a letter from Evan wherein he had told of attending his first news conference with President Roosevelt. Evan, as one would expect, was completely honest and fair in his appraisal of the impressions the president had made upon him. I know that some of the operators, despite the Democratic political leanings so dominant in the area, couldn't believe that this person Evan was describing was the same person who had been a party to forcing them into collective bargaining and all the other ills ordinarily laid at the president's door. Evan's heresy was offensive and it was suggested that when he next returned, he be "tarred, feathered, and ridden out of town on a rail." At this point I began to understand what sort of friends Evan had on his side, for an operator and former member of the "pick handle brigade" rose and said, "Boys, you know Evan is our friend; we all know him for the honest, thoughtful, and kind man he is. We all know that he ain't got a devious bone in his body." He went on to offer to fight the man who had raised the suggestion, at which point the cheering in the crowd obviated the necessity of further comment or action.

One must view Evan in the light of the events surrounding him at this time. Our nation was at war with Japan, we had sustained an agonizing naval disaster at the hands of the Japanese, and we were mobilizing all our nation's resources in an effort to help ourselves and our allies. There is no way that Evan's broad knowledge of the world and its mineral resources could be submerged in E&MJ bureaucracy. In the first issue wherein his name appeared on the masthead was a minor editorial which was so much Evan Just that he might as well have had a by-line. Boake Carter, a columnist for the New York Daily Mirror, had in his column reported the existence of "rich tin deposits in almost unlimited quantities in Colorado, New Mexico, Texas, Washington, and Oregon." Only Evan could have chosen the words used to flay Carter for his "abysmal ignorance" and "mischief making" remarks.

There was, let me assure you, nothing superficial about Evan. He told it as he saw it! He seemed happiest when he was flagellating the "bumbling bureaucracy," "industrial fat cats," and other "nincompoops" whose activities hindered the war effort. Evan was first and foremost a patriot.

In mid-1944, Evan became editor of this prestigious periodical succeeding the venerable H.C. Parmalee. There were interesting changes made in the format but not in Evan's indignation at "the parasites of patriotism." As World War II was nearing the end he foresaw many of the problems which later haunted the nation. Correctly, he pointed out those problems which had arisen after World War I and he was appalled that our industrial and labor leadership could be so blind. Evan recognized the chaos that could result from stockpiling, governmental production facilities, currency manipulation, wage and price controls, and the like, and he warned our industry. I am sure it was disheartening to note the repetition of past mistakes but I never heard Evan "bellyache" or let up in his zeal to promote the needed leadership.

Upon his departure from E&MJ, Evan and his wife Marian moved to Woodside, California where they were our neighbors. I can't tell you how many ailing plants he took from my wife and nursed them back to health and returned in full, healthy bloom. Nor how many meals we exchanged with them both. They were wonderfully kind and thoughtful neighbors.

Upon his arrival in the Woodside area, Evan had accepted a professorship at Stanford University. Here too his knowledge of mineral supply and availability was appreciated and he undertook to bring to Stanford's mineral engineers an awareness of the importance of this intelligence to the world as it was emerging. I have yet to run across a former student of Evan's who did not intensely like him. His wry wit was a joy to all of his classes. And, too, Evan encouraged his students to drop by and share with him their personal or academic problems. Marian invariably would have a home cooked meal for the lonesome student. Until her death, Evan was unstintingly served by this generous and charming lady, a "blithe spirit," an ardent baseball fan who didn't mind driving to Candlestick Park, a person who filled the neighborhood with good humor, gaiety, and warmth. There is no question that a spark went out of Evan's life when she passed away.

Everyone today tries to prove a point by using a poll. I am no exception and have polled a number of Evan's friends, associates, and students in the quest for a better description than I can articulate. There was a remarkable consistency in their comments when I asked for a sentence to describe Evan Just. Later, several have called back to reinforce their words with new ones that they thought were more descriptive. I can give you these results in the following condensation:

> Evan Just is not superficial; he is a remarkable teacher; he is modest to a fault; he is often naive; he is intellectual, but never a snob; he is a person of broad knowledge and experience; he is kind and thoughtful; he is solemn and contemplative; he is utterly honest; he is the soul of integrity; he is the most articulate person I have ever known.

In conclusion, he is in my opinion a person who spent all of his life preparing himself to be for my generation our "man for all seasons."

James K. Richardson
President Emeritus, Arizona Mining Association

May 1989
Silver City, New Mexico

## INTERVIEW HISTORY

Evan Just, born in 1900, had an extensive career as field geologist, petroleum engineer, mining association director, editor, Marshall Plan administrator, and university professor; he has been designated a Distinguished Member of the Society for Mining, Metallurgy, and Exploration [SME]. Because of his unusually broad knowledge of the mining industry, he was selected to be interviewed for the oral history series on Western Mining in the Twentieth Century.

In his oral history he describes his education at Northwestern University and the University of Wisconsin, and tells of exploring for aluminum in the Soviet Union and for emeralds in Brazil, examining the mica mines of New Mexico, and working as an engineer in the Oklahoma oil fields and the Southeast Missouri lead district. He served as executive director of the Tri-State [Missouri, Kansas, Oklahoma] Lead and Zinc Ore Producers Association during the late 1930s. During the 1940s he was editor of the Engineering and Mining Journal and one of the chief spokesmen for the industry. He took a leave (1947-1949) to direct the minerals division of the Economic Cooperation Administration [ECA, Marshall Plan]. His oral history, in telling of these activities, gives an insider's look at the frustrations of bureaucracy.

From 1952 to 1958, as vice president of Cyprus Mines Corporation, he headed up a new exploration division to search for mining properties outside the western United States. He tells of setting up what he terms "listening posts" in places such as Flin Flon, Manitoba; Vancouver; Quebec; and Peru. He speaks of frequent travels to nearly all the provinces of Canada, as well as Peru, Turkey, Morocco, and Ireland. He recommended several promising properties, but they were turned down on grounds other than the mineral economics. He says of this experience, "They almost acted as though they didn't want a good mine when they had it....This is kind of ironical because it wasn't many years after that, that instead of this deep conservatism, Cyprus became one of the most adventurous companies in the business, and still is today."

Throughout his career, Professor Just taught at universities: Northwestern, Lehigh, New Mexico School of Mines, Columbia, Guanajuato (Mexico), and Stanford, from where he retired as professor (now emeritus) of mineral economics. These activities are also discussed in this volume.

The breadth of his experiences warrants two introductions for the oral history. One is by his former student Noel Kirshenbaum, Stanford alumnus, now manager of mineral projects development for Placer Dome U.S. Inc. The second is by James K. Richardson, longtime colleague who succeeded Evan Just as director of the Tri-State Ore Producers Association and later directed the Arizona Mining Association.

Professor Just is a modest man who has refused some of the prestigious medals and awards of his profession. Several friends and advisors for this oral history series persuaded him to consent to be interviewed. The official letter of invitation was issued on 8 February 1989. Once his reluctance had been overcome, he was gracious and cooperative, preparing carefully for each interview, with documents at hand in case they were needed for reference.

Interviews were held in February and March 1989 at his home in Menlo Park near Stanford University. Fine Japanese antiques testify to his father's travels and career as a tea merchant; Evan Just lived in Japan for nearly a year as a boy, and visited there later in his life.

Professor Just's years rest lightly on him. He is a bit hard of hearing, and at the time of his interviews (when he was eighty-nine) his knee was stiff as a result of a recent fall while doing some repair work on the roof of his gazebo; his memory, however, seems unimpaired.

The manuscript was sent to him for review, and he returned it very promptly, with slight changes. The tapes of the interview are deposited in The Bancroft Library.

Eleanor Swent, Project Director
Western Mining in the Twentieth
Century Oral History Series

October 1989
Regional Oral History Office
486 The Bancroft Library
University of California at Berkeley

Regional Oral History Office
Room 486 The Bancroft Library

University of California
Berkeley, California 94720

## BIOGRAPHICAL INFORMATION

(Please write clearly. Use black ink.)

Your full name EVAN JUST

Date of birth Sept. 18, 1900 Birthplace Chicago, IL

Father's full name Nober Gottlieb

Occupation Tea Importer Birthplace Denmark

Mother's full name Selma Hillquist Gottlieb

Occupation Housewife Birthplace Chicago, IL.

Your spouse Marian Elliott Just

Your children Karen Just Penhasi

Where did you grow up? Chicago, IL.

Present community Menlo Park, CA.

Education BS Northwestern Univ. - Geology
MS Univ. of Wisconsin "

Occupation(s) Geologist, Petroleum Engineer, Association Secretary, Editor Professor

Areas of expertise Geology, Mining, Petroleum Engineering, Mineral Economics

Other interests or activities

Organizations in which you are active Formerly, Amer. Inst. Min. Met + Pet Eng.; Min. + Met. Soc. of Amer.; Amer. Assoc. Pet. Geol.; Mining Club (NY); Cosmos Club (Wash. DC).

# I EARLY YEARS, 1900-1925

[Interview 1: February 9, 1989]##

Swent: Would you like to tell a little bit about your early years, where you were born and when, and your family?

Just: The very beginning was rather odd because I was born dead, and it took them more than an hour to make me come to life. I was a seven-month baby, and if it hadn't been for an aunt who insisted on the doctors continuing to work on me when they had given up, I wouldn't be here.

Swent: Oh, my! I guess we should say that you're very much here. You're what, eighty--.

Just: Eighty-nine.

Swent: Eighty-nine and tall. How tall are you?

Just: I'm six-feet-one now. I was an inch and one-half higher than that.

Swent: So you were almost six-three and obviously not a frail person.

Just: No, it didn't seem to affect my health, except it could easily have affected my existence. But at any rate, I was born in Chicago and grew up there, went to the public schools. My father was a tea merchant, and when I was very young he had a Japanese partner. The partner did the work in Japan, and my father ran the Chicago office. But along about 1910, the partner disappeared with a good deal of money, and from that time on, my father had to do the whole business himself. So he went back and forth to Japan. Every year he would be in Japan from approximately April to November.

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##This symbol indicates that a tape or segment of a tape has begun or ended. For a guide to the tapes see page 129.

## An Extended Stay in Shizuoka, Japan, 1912

Swent: Did you ever go with him?

Just: Yes. I was there in my twelfth year and spent that season there; stayed out of school, but it was quite educational.

Swent: I'm sure it was. Did you go out to tea plantations?

Just: No, not particularly. The town of Shizuoka was surrounded by tea plantations, so you didn't have to go very far to see tea. But most of the tea is grown on hillsides, and most of the flatland, which was more visible from the town, is given over to rice paddies. But I played with the Japanese kids. I picked up enough of the lingo to be able to communicate in a primitive way. I had a quite interesting time there, and I remember a good deal of it. Of course, Japan in those days was not at all comparable to Japan today.

Swent: Where did you stay?

Just: We had a house in the town of Shizuoka which my father rented the year around. It was a typical Japanese house with straw mats on the floor--you had to take off your shoes to go in--except that it was a two-story house. Most of the Japanese houses are not two stories, but they all have paper shutters for walls, and our house was that way.

Swent: Was your mother also with you?

Just: Yes. My mother used to go back and forth occasionally, and her sister who lived with us. When my father's business went kaput, my aunt volunteered to go with him and be his secretary. She gave up a secretarial job in Chicago, so she acted as his secretary in Japan.

I was there again in 1928 when I came around the world after being in the U.S.S.R. for a year. I spent two months in Japan with my parents.

Swent: That must have given you a very international outlook early in life?

Just: Yes, as I said, it's so remarkable how much Japan has changed. Wages, of course, you paid a servant a couple of dollars a month, and they were glad to get it. The Japanese people naturally all

Just: wore the kimono, and these days, my impression is that most of them wear Western clothes. Of course, the cost of living is incredible and certainly incredible if you think of what it was for them in those years.

## Chicago Schools

I went to the Chicago public schools. I was always a rather easy learner, so I had a good school record. But I think it's possibly worth noting that even though this was an ordinary public school education in Chicago that it was a good education. I think I got better English teaching in a Chicago high school in those years than they get in college today. Sorry to say, but it's true. The public school gave me a perfectly adequate basis to go on to college. I had no struggle at all to make the transition. It's rather interesting; Chicago today is one of the problem areas of the country from the standpoint of public education, but in those years, it was very good.

Swent: What high school did you go to?

Just: Nicholas Senn was the name. It was a new school at the time. I was part of the first class that entered it as a freshman. I have always had an interest in outdoor life. I first thought of being a farmer and went down to the University of Illinois to enroll in agriculture, but somehow I realized that my background didn't fit me very well for agriculture. I felt rather lost, so I came back and went to Northwestern and studied geology. This was at the suggestion of a cousin who was aware that the petroleum business was a rapidly growing business, and petroleum geology was an attractive professional field.

Swent: When did you graduate from high school?

Just: 1918.

## The Boys' Working Reserve, World War I

Swent: So you were in high school during the First World War?

Just: Yes. Incidentally, during that time they let the boys out of school early if they would go to work on farms. So I came out and worked in Medford, Oregon for my uncle who had a couple of orchards there. So I became acquainted with the West Coast and also with the wonderful steelhead fishing on the Rogue River.

Swent: That appealed to you as a young boy, of course.

Just: Oh, yes. My uncle was a sportsman, and we used to go fishing every weekend.

Swent: Did you run into Ian Campbell in Oregon at all?

Just: Oh, no. As I recall, Ian's father was a professor at the University of Oregon.

Swent: I think he had orchards.

Just: Well, it could have been both, as far as that's concerned, but I didn't meet Ian until my senior year at Northwestern when he came there for a master's degree. We were colleagues together for one year.

Swent: To get back, so then you were at Medford in the summers when you were still in high school?

Just: Yes, they called it the Boys' Working Reserve. As I said, they let the high school boys out of school early if they'd go to work in agriculture.

Swent: Early in the spring, you mean?

Just: Yes, about April.

Swent: I see. Were you paid at all?

Just: No.

Swent: Did you pay your own way out to Oregon?

Just: Yes, but that was simply because I was working for my uncle. At any rate, I didn't get paid.

Swent: You went by train?

Just: Yes.

Swent: It must have been an interesting train ride.

Just: Yes, it was. One of those--I went out there for two years--and one of them was through this D and RG-Western Pacific connection through the Royal Gorge in Colorado and through the Feather River Canyon in California, a very scenic trip which I've never forgotten.

Swent: Then you must have done this also when you went to Japan. You came out to San Francisco or Oakland by train and then the ship.

Just: Yes. We came to San Francisco. You had to come across on the ferry, of course. There was no train into the city from Chicago.

Swent: Then a ship from San Francisco to Tokyo?

Just: Yes, stopping at Hawaii. It took six days to Hawaii and a day in Hawaii and then ten more days to Yokohama.

Swent: So a month of your time was taken just traveling?

Just: Just about, yes.

Swent: By the time you were eighteen or so, you had done a great deal of traveling then.

Just: Yes, for a youngster. On that trip to Japan, my mother and I stayed on the boat and went down to Shanghai and Hong Kong and Manila. That was the route that the ships took at that time. Manila being the farthermost point.

Swent: So you were at University of Illinois, and then you changed to Northwestern?

Just: Yes, I didn't enroll at the University of Illinois. I just realized that it wouldn't do before I enrolled. I came back, and I went to Northwestern.

Swent: Was coal mining big in Illinois at that time?

Just: Yes, but the department of geology was not particularly industrially oriented. It was simply, like most geology departments, a scientific department. The head of our department--a man who had a great deal of influence on my life--Dr. U.S. Grant, was a consultant to a small gas company in southern Illinois. In fact, after my junior year I did a summer job down there making a plane table map for that enterprise. I worked with Dr. G.F. Cady, who became state geologist of Arkansas.

Swent: What was the company?

Just: As I recall, it was called Mid Egypt Oil and Gas Company. I believe that was the name. "Mid Egypt" was correct; I'm not sure whether it was "Gas" or "Oil and Gas." At any rate, I had some experiences in some extremely hot weather. I think that was the most uncomfortable heat I ever experienced in my life.

Swent: Really, in southern Illinois?

Just: Yes. We stayed at a hotel, and actually, we had to run the cold water into a bathtub when we left in the morning to have the water cool enough to get into for a bath. The cold water tap was uncomfortably hot. The water supply would lie out in pools in the sun and get well heated before it got into the pipes.

The other hot place I remember the most is Manila. The boat spent three days at Manila, and it was just as sticky and hot as you can possibly tolerate. So those are the two hot places in my experience.

## Studying Geology at Northwestern University, 1918-1922

Swent: Is there anything else that's significant about Northwestern? Were you in any organizations there?

Just: I joined the AIME [American Institute of Mining, Metallurgical, and Petroleum Engineers] when I was a senior at Northwestern at Dr. Grant's urging. So I've been a member of that organization, see, is that sixty--?

Swent: Sixty-eight.

Just: Sixty-eight years?

Swent: A long time, yes.

Just: At Northwestern, we got a good geological education. It was basically what you'd call a hard-rock school because Dr. Grant was a specialist in Pre-Cambrian geology. But we had a diversified curriculum, and Northwestern was, and as far as I know still is, a school of good academic standards, so you had to work for your grades. I think I got a good education there.

One thing which has helped me all my life was the degree of literacy I obtained in high school and at Northwestern, much of which was required, that helped me a good deal in later life. I think I've had as much advantage from being literate as I have from technical knowledge. So I would put in a plug for this idea of required courses in the college curriculum and not simply let the students take whatever suits their own wishes. This movement came to a head in the 1960s here, and I thought, and still think, it was too bad that they weren't more strict about requiring a certain breadth of education beyond the major subject. Now, of course, they're going back to having more required courses than they did in the 1960s, and I think that's a good move educationally, because young people are often not in a proper position to judge what's best for them. Even if they're college age, that's still true.

Swent: Now, I'm trying to think when did the University of Chicago start being experimental? When did the experiments begin at the University of Chicago? Was that after your time at Northwestern?

Just: Well, I don't know anything about it.

Swent: Hutchins and Adler and some of those people were experimenting with different curricula.

Just: Is it what you'd term progressive education?

Swent: Yes, I was wondering if you were aware of any of this when you were at Northwestern. I was just thinking that there were some innovations in education at that time, but you probably weren't aware of them as a young student.

Just: Well, that could have been. I can't recall any evidence of it at Northwestern in my time, and certainly not in the Chicago public schools. It became a problem later. For example, when we lived in Scarsdale, New York in later years, our particular area sent its children to Bronxville High School, which had a reputation as a so-called progressive school. We took our daughter out of the public school and sent her to private school because we didn't think she would do well in that environment. I'm talking now about the 1940s.

I also ran into the term, you might say, when in approximately 1928 I was asked to give a talk in Evanston about my experience in the U.S.S.R. At the same program was a man who was considered a pioneer in progressive education, and he was the principal of a school in the north suburban area of Chicago. I can't recall the man's name, but we gave such totally different concepts of the U.S.S.R. that I'm sure the audience couldn't believe we had both been to the same place. He thought everything was wonderful, and I emphasized the horrors of a police state.

Another thing I would say about my education at Northwestern is that we had to go to chapel three times a week.

Swent: Northwestern was a Methodist university, wasn't it?

Just: Yes, it was Methodist. I was never very much for religion, but most of those chapel talks were by visitors who were people of note of some kind or another. They gave me a strong sense of the value of service, that one's life should be dedicated to something beyond selfish purposes. I think that was a fine thing. Chapel was never too popular with the students, but at least it gave us a very good moral grounding from the standpoint of one's relationship to the rest of the community.

Another part that might be of some interest is that I became, in a certain sense, skeptical of Darwinism when I took paleontology there as a sophomore. It's not that I had, or ever since have had, any question that we came up through an evolutionary experience, but even at that elementary level, I became aware that there is a momentum to organic change that is, in my opinion, contrary to pure Darwinism. In other words, Darwinism is basically the concept of variation through mutation and selection of the more efficient mutations by the survival of the fittest. Actually, there's abundant evidence in organic evolution that different species develop certain trends and, even if it becomes a handicap, they just proceed even to extinction with those trends. They don't seem to be able to reverse. In other words, according to Darwinism as I understand it, there's no reason why a movement in the wrong direction from the standpoint of survival couldn't be reversed.

For example, we don't really know what extinguished the dinosaurs, but one of the concepts was that they had very little intelligence and maybe were too big and too cumbersome. Actually, either of those traits could have been reversed through mutation and natural selection. But throughout history most organic stocks take on a certain propensity, and they never reverse. They carry it right through to extinction. Also, I believe that the controls that affect survival are few and simple enough that there ought to be much more convergence of types rather than the marvelous diversity which exists and that many species carry around handicaps that mechanistic processes should have eliminated.

##

Swent: So you began questioning Darwinism early?

Just: Yes, I don't question evolution, but I question the mechanism. As I said, I couldn't account for this momentum in organic development. Later on I became aware of other objections to Darwinism, in quite recent years I mean, because I never became a specialist in paleontology. But one of the principal objections is the fact that we don't find linkages between species that presumably grew one out of the other. Actually, according to what I would call straight Darwinism, there really ought not to be any species, but we would just have all kinds of bridges between what we call species. The record of rocks doesn't support that. We see species, but we don't see the links. There is something beyond blind mechanism in evolution.

Swent: Who was your paleontology professor?

Just: It was a very competent lady named Margaret Fuller, who later married a man named Boos, and she insisted on calling herself Margaret Fuller Boos. [chuckles]

Swent: Her students must have had a great time with that one.

Just: The marriage was after she left Northwestern. She went off to Colorado and did quite a bit of field work out there, but I lost contact with her. I really don't know much about her later career.

Swent: Were there many women in geology at Northwestern?

Just: No, she was the only one, and we didn't have any girls in the curriculum. Now, of course, there are a good many girls in geological curricula, and doing fine work, too.

Swent: Geology was also quite a controversial topic at that time, wasn't it? There was a lot of excitement in geology.

Just: Well, not as much as the excitement that developed. I think the big excitement in geology came after the International Geophysical Year when they obtained all this geomagnetic information that made them realize about plate tectonics. To me, that is the most exciting thing that happened in geology, and of course, it has contributed immensely to our knowledge of earth history.

Swent: Was there any intimation of that when you were a student?

Just: Shortly after, as I recall, it was in the middle 1920s when our geological profession became aware of the concept of continental drift which was fostered by a German scientist--.

Swent: Wegener?

Just: Wegener. I think they pronounced it "Vegener." I remember about 1928, somewhere in there, the American Association of Petroleum Geologists published a volume entitled Continental Drift, and it gave pro and con arguments about it. At the time, I always thought that the pro arguments were more impressive than the con arguments, so I've always been, you might say, a disciple of the concept of continental drift. However, the geological profession pretty much threw it out the window until this geophysical year came along in the 1960s.

When I was graduated from Northwestern on that first summer--.

## Working in Oklahoma Oil Fields, 1922

Swent: What year was this?

Just: That would have been 1922. That summer I went on to Oklahoma to start out in the oil fields. At that time, geological employment was very much subject to fluctuations in the price of oil, and I happened to hit a low spot. Geological jobs were not easy to find, and I didn't find one, but I did get a job as a field clerk for a small oil company named H.F. Wilcox Oil and Gas Company. I went out to a boom area at Bristow, Oklahoma where this company had several producing wells and leases. The principal lease was called the Poor Farm lease, and the night I arrived--I arrived out there in the evening--I was greeted by a tremendous display of fire. One of the wells was wild and on fire, and all the tanks around it were on fire. The tanks were spilling into the creek, and the creek was on fire for half a mile. So it was really quite a spectacular introduction to active life in the oil fields.

My duties there were simply to make the rounds of the drilling wells--we had about a dozen wells drilling at that time--and report their progress into the office each day, and then keep whatever books were necessary out in that field office.

Swent: What kind of drilling did they do?

Just: It was all cable tool drilling at that time. The rotary method--I guess it came into being about the same time down in Texas, but up in Oklahoma in those years, there was no rotary drilling.

Swent: So did you actually make measurements, or did you take the information that somebody else gave you?

Just: No, the drillers would give me their measurements. One of the things I remember rather vividly about it is that there was another clerk there named Cooper. We not only had the same room in the dormitory, we slept in the same bed. But then after about a month, he left, and my first night alone in bed I became aware of thousands of bedbugs. I couldn't sleep all night. Every time a bedbug touched me, I would jump, and in the morning I discovered that the cracks in the walls and the bed was just loaded with bedbugs. I went to town and got some pyrethrum powder and got rid of them in a hurry. But the only explanation I can give for that experience was that the bedbugs liked this other chap, and as long as he was in bed, I was never disturbed. But why he wasn't, I can't imagine because there were hundreds of them.

Swent: The company had a dormitory and provided you your housing?

Just: Yes. We were out four or five miles from town, and in the fall and wintertime the roads were so deep in mud only a heavy truck could get through, or a horse-drawn vehicle. My nickname during that experience was "Polecat Slim" because I had got hold of a couple of little polecats and was trying to raise them. And this caused a good deal of amusement amongst the people in the camp.

Swent: A polecat is a skunk, isn't it?

Just: It's a little skunk-like animal. I think there's a difference between a regular skunk and a polecat. But lots of people just called any skunk a polecat. My employment there was not terribly long.

Swent: How much were you paid; do you remember?

Just: I can't remember specifically, but I would guess it was in the neighborhood of $150 a month.

Swent: That was quite good, wasn't it?

Just: Well, you could live on it and save money, at least under those circumstances. My employment there didn't last terribly long because one of the things I had to report was the production of a system of getting rid of water emulsion in the dregs of the oil tanks. We had a separator plant which was using centrifugal separators--very much like were used in cream separation--to break up the emulsion and separate the water from the oil. I was supposed to report that production.

I discovered that the man in charge was running clean oil into his tanks to get credit for oil he wasn't treating, and I objected to that. A few days later he came down to my little office and started to become objectionable, and I invited him out to settle it with our fists. To my utter astonishment, I cleaned up on him, and then the farm boss came running up and fired me for, I guess you'd call it brutality. Actually, this chap was a buddy of his, and he didn't stop to investigate the merits of the case. He simply fired me. So that was the end of my experience with the Wilcox Oil and Gas Company.

At that time, I had a little money in my pocket and decided to go home for Christmas, which I did. Then Northwestern offered me a chance to be a laboratory assistant in geology for the spring semester. So I handled a laboratory there that spring, the spring of '23.

Then as soon as school was out, I went back to the oil fields in Tulsa and was offered a job by a friend that was a Northwestern graduate, John W. Merritt, who was a consulting geologist in Tulsa. I was the instrument man. He had another geologist, Frank Wiest, who was the geologist in charge of our party, and we did the field work. In those days, oil field geology was strictly surface work. The junior man did the plane table work, and the senior man carried the rod and picked out the outcrops which would be put on the map.

They had a rather interesting way of doing surface geology in that particular region. The common concept is that you find a marker bed, and you just take elevations on it wherever you can find it. But in those particular areas where we were working, which were largely between Tulsa and Oklahoma City, outcrops were very uncommon, so we didn't have any identifiable marker beds. But sandstone benches would stand out as rather inconspicuous topographic benches. We'd follow these benches along for a few hundred or a thousand feet, and when they played out we'd jump to another bench--hopefully one that would overlap it so that we could get an interval between them. So we'd carry on these different short benches, and thus were able to make what you might call a dip-and-strike map of the area and actually draw structural contours. It was a rather ingenious way of doing surface geology without any specific marker bed, and it worked very well.

Swent: Developed by the necessities of that locality.

Just: Yes. Also, you could do reconnaissance work from an automobile by simply studying the profiles of hills in the horizon. The general regional dip in that area was to the west, and whenever you'd see a profile of a hill that seemed to show a flat or an easterly dip, that was something worth going in and investigating closer for what we in those years called a structure. In other words, a structural dome or a terrace.

So it was an ingenious system, and it worked very well. Of course, practically all of the oil, up to that time, was found by surficial location of "structures." I should mention that much oil and gas was found by wildcatters without geological assistance. Actually, the greatest pool ever developed in the lower forty-eight states, the East Texas pool, was drilled by Dad Joiner, against geological opinion, about 1930. He struck a wedge-out of the Woodbine sand on the flanks of the Sabine uplift.

In the summer of '23, Dr. W. J. Mead of Wisconsin University asked my employer if he could spare an instrument man to do some topographic mapping of an abandoned fluorspar mine in Kentucky. Business for us was a little bit slack at the time, so he lent me to the Aluminum Company of America. They were investigating this fluorspar mine near the town of Mexico for a possible reopening to obtain fluorspar for the smelting of aluminum. I spent two months there fighting chiggers and heat and briars because they wanted a contour map on a five-foot interval, which required a lot of detail. That was when I became acquainted with Professor Mead, and he urged me that I ought to go back and get some more schooling, which I did a year later.

Another experience while I was employed with Dr. Merritt was in Colorado. We did a moderate amount of work out in what's called the Denver Basin, east of Denver and east of Colorado Springs. We found some structures out there and drilled holes near the town of Watkins and near the town of Calhan, none of which, however, were productive.

## Graduate Study at the University of Wisconsin, 1924-1925

In the fall of 1924, I decided to follow Professor Mead's advice, and I went back to school at Wisconsin where I took a master's degree. At that time, Wisconsin University had an eminent geological faculty. There was Dr. C. K. Leith who was widely known in Pre-Cambrian geology and later became a very prominent minerals economist. As a matter of fact, a great many of his graduates like myself became interested in mineral economics because of his interest in it. Then there was Dr. Warren Mead who was a structural geologist and a very brilliant man. Later he went on to become head of the geology department at MIT. There was Dr. A. N. Winchell who was a mineralogist, a really eminent scholar, who in those years was doing a lot of work on the mineral series, the amorphous series. He had worked out a theory about these amorphous series which was pioneer work. Then there was W. H. Twenhofel, who was the paleontologist, very well known in that field. So we had those four eminent geologists on the faculty at that time. There was also another well-known professor with whom I didn't study, but his name was Frederick Thwaites. He was a glacial geologist, and I had had a good deal of glacial geology at Northwestern, so I didn't have any need to study under him.

We had about thirty graduate students in the department. At least half of them were Canadians because Wisconsin was well-known for Pre-Cambrian geology, and the students there set a very tough pace. If you didn't make a ninety-three, you were just nobody in that group, and believe me, it took work to get a ninety-three out of those professors because they were all people who didn't believe in coddling students. So it was a rigorous year, but I learned a great deal.

Swent: Was it mostly lectures or laboratory work or field work?

Just: Both, mainly lectures, however. Lots of laboratory work in paleontology. Dr. Twenhofel was absolutely merciless in the assignments he gave us. Again, it was all to the good because we had to learn a lot.

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# II A FIELD GEOLOGIST, 1925-1931

## Southeast Missouri Lead District

Just: When we were graduated at Wisconsin in 1925, one of my student colleagues got a job in southeast Missouri. His name was Bill Barrett, and he was made manager of an exploration effort to find new lead deposits in the southeast Missouri lead district. He invited me to come along as geologist for this effort, which I did. So that was a switch out of the oil fields into mining, actually mine exploration. My job was to take a large geological map of the area and check it and do more detail than was evident on that map. So it was simply day after day going out and doing areal geology just by slugging it out in the woods and fields.

Swent: More chiggers?

Just: Yes, plenty of chiggers. I also had the chore of surveying in all the drill holes. We had a couple of diamond drills drilling in what we considered likely spots. I had to survey in the location of these drill holes.

Swent: Were the diamond drillers independent of you, or did you tell them what to do?

Just: They were contract drillers from the E.J. Longyear Company, and that's when I first became acquainted with Longyear's. I became quite friendly with Bob Longyear many years later, who then was president of the company.

Swent: A Minnesota company, isn't it?

Just: Yes, Minneapolis.

Swent: But did you tell the drillers then where to drill?

Just: No, that was Barrett's job, the manager. We didn't have much luck.

The enterprise there in Missouri was called Missouri Lead Incorporated and had been founded and promoted on an idea that had been gained within the St. Joseph Lead Company and "leaked" by an ex-employee, that the ore deposits of the district occurred where the base of the Bonne Terre formation was within a short range in elevation above sea level. The enterprise optioned up all the available ground in the entire district that seemed to conform to that concept. This involved a very large option program. We had, as I recall it, options on approximately 100,000 acres. It involved a drilling program that went on for about four years, although I wasn't with the program for all that time. After about three years, the enterprise ran out of money and was taken over by the Anaconda Company.

That's where I first met Frank Cameron who at that time was a geologist for Anaconda and was put in charge of this enterprise. Frank Cameron later became the vice president, then president, and then chairman of the board of the St. Joseph Lead Company. Neither our effort nor Anaconda's work found any good oil bodies, so by and large the enterprise was unsuccessful.

Swent: Where were you working?

Just: It's called the Southeast Missouri lead district. It's about sixty miles south of St. Louis and about twenty miles in from the Mississippi River. We were headquartered in a town named Farmington, and the prominent mining towns were Flat River and Bonne Terre, and Fredericktown. But while I was there I had two opportunities to do foreign work, which I did on leave of absences from Missouri Lead. The first was an expedition to Brazil in search of emeralds.

## Emeralds in Brazil

Swent: Is this the one you wrote the paper on ["Emeralds at Bom Jesus dos Meiras, Bahia, Brazil," Economic Geology, Vol. XXI, No. 8, December 1926]?

Just: Yes. Dr. Farrington of the Field Museum of Chicago had spent a couple of years in the backwoods of Brazil. He was a mineral curator of the Field Museum, and he had brought back some large crystals of emerald. As I recall them, they were about four or five inches long and about an inch thick, hexagonal prisms, and they were on display at the Field Museum. I had a friend in Chicago who was in the jewelry business, and he's the one who got me into this effort to go down to Brazil to see if possibly this could be mined at a profit. So a Chicago jeweler named George Adamson and myself went to Brazil. That would have been 1926. We took the boat from New York to Rio and then came back up the coast to Bahia and then inland from Bahia on a wood-burning train on the railroad that went into the diamond fields. We took mules, about a week-long mule trip down to this town of Bom Jesus dos Meiras.

Swent: A week's mule trip?

Just: Yes.

Swent: That's quite a trip.

Just: Yes. Well, this was an interesting experience in the business of field geology. First thing I remember about it was that on that railroad, we were the only first-class passengers on the train, which was a short thing, but they wouldn't let us take our coats off in the railroad car. If you wanted to take your coat off or if you didn't have shoes, you had to ride in the third class.

Swent: It was terribly hot, I presume.

Just: Yes, it was quite hot. It was very uncomfortable having to sit with coats on.

Swent: Collars and ties and so on?

Just: Yes. I remember also the little hotel in the town where the railroad terminated near Bahia--the town was called Cachoiera. That little hotel was very similar to, I'd say, a chickenhouse, but at the same time, they insisted on our wearing our coats to dinner. At the same time, men would come to the dining room in their pajamas and women in dressing sacques. But that was okay. While a man could come in pajamas, he couldn't come in his shirt sleeves. I remember while I was in Bahia for a few days, I went out in my shirt sleeves from the hotel to buy a newspaper, and the policeman chased me back into the hotel. Well, at any rate, getting back to the railway--.

Swent: Excuse me, did you speak Portuguese?

Just: No, I spoke a little Spanish, but actually, you know, that was rather confusing. Spanish wasn't really much of a help in Portuguese because it was more confusing than anything else.

Swent: So did many people speak English?

Just: We had an interpreter with us. He had held us up, by the way. We had a chance to visit Rio for two weeks simply because this fellow turned up late, and our ship up to Bahia went away without us. Brazilians, at least at that time, had little regard for time. He just shrugged his shoulders. He said, "Oh, there'll be another boat in two weeks." So we spent two weeks in Rio on his account.

At any rate, getting back to our travels on this train--the train had no dining facilities, and you'd have to grab whatever was being offered at a station when it stopped. That would be bananas or pineapple. Then at night it stopped, and everybody made a rush for a little, old, I'd guess you'd call it a hotel. But other people got to the beds first, and Adamson and I had to sleep on the dirt floor. Then when we got to where we left the railroad at Triunfo, we waited four or five days for the mules to come, which had been arranged. This was a little hotel with a dirt floor, with chickens and pigs running around underneath the dining table and a mule looking in through the window. Well, it was all fun.

Swent: Did you ever get sick?

Just: No. Then when we got out, going on this trip, the vegetation in that region was all very thorny, and the trail was cut between walls of thorny brush of all kinds, so that if you had a runaway or anything and had to go through that, it was almost impenetrable. It would have just torn the clothes right off one. We were practically walled in by this thorny brush, to the trail. We set off for approximately a week of travel. We made it down to Bom Jesus, and this wasn't really a mine. It was just some primitive diggings where the local farmers would work looking for emerald in their spare time. There was no shaft or underground working of any consequence. It was evident to us that it was just too chancy a thing to establish a commercial enterprise. It was all right for people who were using spare time, but the frequency of the finds was not sufficient to make you believe that you could support a going operation.

Actually, this is fairly characteristic of gem mining. I remember years earlier I had a school friend whose father was involved in emerald mining in Colombia. Then I learned that that enterprise might go for a couple of years at a loss and then find a few stones that would pay for the losses. A very chancy type of operation. Well, we decided not to try to establish any mining there, but we did buy some stones, two of which were gem stones; the rest was poor material which my partner thought could be cut into beads and handled in that way. We had about a quart of that stuff and these two emerald prisms, one of which was about two inches long and half an inch thick, and the other one was about three inches long and an inch thick. These we took back with us. We simply retraced our steps back to the railroad and to Bahia and then down the coast to Rio.

Swent: Were you nervous about traveling with these gems?

Just: No, not in particular. As I said, we retraced our steps and got back to New York and then to Chicago where we handed over the loot [chuckles], and that was that. The stones, while they had good clarity and good color, weren't quite the same as the Colombian standard. The Colombian standard was a little bit more of a yellow green than these stones. So on the market, even though the color was deep enough, it was a little more of a blue green; thus the stones didn't have the same sales value as the Colombian gems had.

## Bauxite in the U.S.S.R.

Well, then I went back to Missouri Lead, and a short time later, Barrett and I took a trip up to visit our old haunts at Madison. We learned from Dr. Mead that he was organizing a trip to the U.S.S.R. on behalf of the Aluminum Company of America. When I found that out, I begged him to find some kind of a chore for me. Even if I could go as cook, I would love to go with them. At the time, he didn't state where the expedition was headed. He indicated it was to Europe. No commitment was made, but a short time later [when I was] back in Missouri, he called me up and asked me if I'd like to go. I jumped at the chance after Barrett gave me the opportunity to take another leave of absence. The general presumption was that we were going to somewhere in southern Europe because the known bauxite deposits were in Greece and Hungary. But we didn't know until the day we arrived in New York, the day before we took ship, that we were going to the U.S.S.R., which happened to be a little bit unfortunate because we were not dressed to go to the U.S.S.R. On top of that, instead of being a couple of months excursion, it lasted for an entire year.

Swent: Through the winter, then.

Just: Yes. We had to send back home for some gear that could be used. They wouldn't let us bring in any new clothing; we had to have old clothing.

Swent: You couldn't buy it there?

Just: We could buy Russian clothing. For example, boots. I sent for some boots, but they weren't the Russian type. You know, the Russian boots are rather like riding boots. I had these boots that I had sent from the U.S. and the ones I had brought with me. Both wore out, and then I tried the Russian boots. They went over in the counter, and that made the side of my foot bleed. It was finally felt boots that worked. But before I got the felt boots, I was actually running around at twenty degrees below zero in bare feet! Now, that sounds incredible, but it's absolutely true.

Swent: And you didn't get frostbitten?

Just: Yes, I did; I still have a loss of feeling in some of my toes.

Swent: Did you have to struggle with passports and visas?

Just: Oh, yes. We spent a couple of weeks in Paris and a month in Moscow before they would let us go to work, all over visa problems. In those years the red tape was simply incredible.

Swent: Was this the time of this New Economic Plan, when they were letting in some capitalist enterprises?

Just: Well, yes. Russia lacked basic industries. They let out some concessions to foreign capital. For example, the Harriman Bank of New York had a concession in manganese mining down in the Black Sea area. A British group had a concession in mining the placer deposits on the Lena River in Siberia.

Swent: That's where Malozemoff was, Plato's father.

Just: Was he? I never knew that. In this case, Alcoa was invited by the Communist government to initiate an aluminum industry. Actually, I can't imagine that Alcoa would have gone ahead with a big investment in a country where everywhere you looked there were expressions against capitalism. Slogans, you know, against private enterprise. So my personal assumption is that the reason they sent us there was to find out how competitive those bauxite deposits might be in a future world market. I just can't believe it would make any sense to spend a lot of money investing in the U.S.S.R. at that time.

Our party was divided between hydrological engineers and geologists. The hydrology people were investigating dam sites for hydro-electric power. The geological group was to prove up some bauxite deposits which the Russians had discovered near the town of Tikhvin which is about 300 kilometers east of Leningrad. I was in charge of the drilling, and my job was to visit the drills every day. We had a couple of what are known as Empire drills. They're hand drills for drilling placer deposits, and we used them for drilling the sands and clays that overlie the bauxite deposits. We had some auger-type bits that would dig the bauxite. We ordered from Russian factories four other drills that were made of much heavier material.

There's a rather interesting commentary on the relative metallurgy of the two countries at the time. These American drills were made of about three-quarter-inch drill rods.

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They lasted throughout the entire year of drilling. The Russian metallurgy, where we had about inch-and-one-quarter drill rods, were on the junk heap within a matter of weeks even with a great many spare parts. The steel in the drill pipe was so soft that it would just twist off.

Swent: Did you have Russian drill crews?

Just: Yes, we simply hired local peasants. They were glad to have the work because they had the spare time and were happy to earn the money. The hardihood of these peasants was quite remarkable. I haven't mentioned, but for four months there during the winter, the temperature never got above twenty below zero. These men would work these metal handles--these were hand-held drills--with bare hands, not seeming to worry about the cold. They were good workmen, too. We had a very good experience with them.

There was a difficulty that came up. At that time, you could say that the unions were almost a part of the government, and they had worked out a scheme. All industry was to be unionized, and the union was to also set up a so-called Red Corner somewhere in the factory premises where the workmen could be indoctrinated with Communist literature. Well, here we had an enterprise consisting of peasants who were not interested in Communism. They were just interested in earning some extra money, and no suitable place for a Red Corner. The union sent out a man to try to set this up.

This fellow lived a life of continuous frustration because his concept was that we should tell him what we wanted done, and he would tell the workmen what to do. We didn't go for that, so he spent all that time in a very frustrated state trying to force his point of view on us. He got nowhere.

The reason I relate this is that in the spring, along about June, when it was quite light at night, we were sitting around in our house--I might say that we lived in two different houses at different stages of the program, both of which were large country houses of the former aristocracy. But these people had been all killed off, and the houses were simply standing empty. The government allowed us to use them--we were in our sitting room, and each of us was doing whatever suited him. I was studying Russian grammar, and I remember the head of our geological party, Dr. E.C. Harder, was sitting near the window writing some kind of letters or notes. This was about ten o'clock at night. When all of a sudden, whammo, there was a terrific noise. None of us knew what had happened, but the thought that went through my own mind was that somebody was shooting at us, and I dropped to the floor to get out of range. Well, we almost instantly recognized that this disturbance was a rock. It came through the window, right past Dr. Harder's head, a rock nearly the size of a man's head. I got up, and I was the first one out of the house. We couldn't see anything, so we just went back.

Each person went back to what he was doing, after a certain amount of discussion. We thought it was quite possible that this union man had undertaken to have this done out of his frustration. But I remember that I went back to my bunk and picked up a knife which I had bought in Moscow. They didn't allow us to have firearms, but I had this knife. I was sitting there with it in my lap, when about half an hour later comes another bang. None of us really expected it, and why I was sitting there with that knife I can't really say. But at least it happened, and this time the rock didn't come through the window. It hit the side of the house, and we weren't so unprepared.

I happened to be the first one out of the place, and I saw this figure disappearing in the gloom down into a plowed field. I took after him over the fence and after him, and I finally caught up with him. He turned around and was fumbling in his pockets. I thought he was fumbling for a gun. So I shouted to the fellows behind me, "Watch out! He's got a gun." In the meantime, I threatened him with this knife. Well, when he saw the knife, he turned and ran, but I caught up with him. I stabbed him, but that didn't stop him. I tripped him up, and I hit him with my fists.

That cooled him off, and then we collared him and took him back to the house. Then we found out that he was simply a drunken peasant who had been visiting nearby and thought it would be fun to throw some rocks through a lighted window. The knife wound didn't seem very bad. We put a piece of tape over it, and we sent him back to the place where he had visited. We thought that was that.

The next morning, when we were at breakfast, he and his wife were running around our dining room floor on their knees begging us not to do anything about the incident because they were afraid of the authorities. We said we wouldn't do anything. We didn't feel at all guilty because he had attacked us, and he could very well have smashed Dr. Harder's head with that first rock. So we thought of it as strictly a self-defense activity.

It worked out that that didn't suit the Russian system of justice, because when I got back from my drill rounds about four o'clock in the afternoon, here was a squad of soldiers waiting for me. They didn't arrest me. Their system of justice was such that they didn't put you in jail until you were convicted. Your passport was registered; you couldn't move without taking a passport, so they had pretty good control over your movements. In the meantime, the way they would work out a case is they would take depositions from all parties involved, including witnesses, as to what happened. These depositions would be reviewed by a three-judge court, none of whom were trained legally, simply proletarian people. Judgment would be passed on the basis of their verdict.

It also developed that the Russian law of those years had no provision in it for self defense. The fact that I had attacked him with a weapon was quite important. I might say that he didn't have a gun. What he was fumbling for in his pockets--when I thought he was trying to get a gun out of his pocket--was rocks. He had rocks in his pocket, rocks about the size of your fist. With no provision for self defense, I had attacked this man, and I also attacked him with a weapon. That looked like a certain amount of time, something like five years, on the rock pile. Along with this, Russian justice had a class aspect to it. I was what the Russians called bourgeois (after the French), and this man was a proletarian. A bourgeois never prevailed over a proletarian no matter what the merits of the case might otherwise be. So it looked pretty grim, and to this day I can't understand why I felt relatively blithe about it. Somehow I guess it just couldn't penetrate into my thick skull that I might spend five years on the Russian rock pile.

The head of our party was quite perturbed about this. We didn't have an ambassador in the country at the time or a consul, nor did the British. The nearest he could come was the Norwegian consul, who said, "I don't know what on earth to tell you because since the Revolution happened, there's never been an incident of a foreigner attacking a Russian citizen in this fashion. I can't give you any idea what's likely to happen." He says, "The only advice I can give is to get your man out of the country any way you can."

Our party chief went to the head of the police at the nearby town of Tikhvin, which was about twenty-five miles away. He brought a couple bottles of vodka with him as a gift, and this man said, "Well, if we didn't have a prisoner, we wouldn't have a case, we couldn't have a trial. So if he would just leave the country, we wouldn't be able to go ahead with this thing." The implication was that they would lift my passport. That's what actually happened. I picked up my passport and left the country. Luckily the enterprise was winding up, so my work was done. Nobody interfered with my leaving the country.

Now, looking back, I'm personally convinced that this didn't happen the way it sounds. This man wouldn't have dared to let me go without some nod from a higher authority. My own guess is that the people in Moscow didn't want to have the possibility of an aluminum concession getting riled up by somebody injuring a drunken peasant. Incidentally, the knife wound healed up immediately within a couple of days, and the worst part about it was that I had hit him in the eye with my fist. For a while it looked as though his eye might be damaged, but that cleared up, too. So he wasn't permanently damaged. So I just simply left the country. I established a kind of historical precedent, should we say.

Swent: How did you leave? They had your passport, but they gave it back to you?

Just: Yes.

Swent: You were able to get it back, and then just took the train to Leningrad?

Just: Just left. Then I took the train from Leningrad to Helsinki and then across to Stockholm, and I went around the world from there and joined my parents in Japan. I went around through the Suez Canal.

Well, to go back to the aluminum business. Our drilling indicated that the Tikhvin deposits were substantial in size but below a normal competitive grade. They were too high in silica to be competitive. Nevertheless, the Russian government did establish an aluminum industry out there. As a state-run enterprise they didn't have to worry about competitive costs. Actually, that enterprise, along with the railroad junction at Tikhvin--that was where the Trans-Siberian railroad branched off north to Murmansk and thus was a strategic railroad junction--was captured by the Germans during the Second World War. They drove a long salient out to capture that junction, and also killed off that aluminum production.

An interesting geological point there was that these deposits were Devonian in age, and you'd expect rocks of that age to be good, solid rocks. But actually, these Devonian sediments never formed into shales and sandstones. They are simply loose clays and sands and gravels which is, as far as I know, the only place in the world where you can find rocks of that age which are unlithified.

Swent: Have you ever returned there?

Just: No; I'd like to.

Swent: There might still be charges pending against you.

Just: I had a very interesting experience there. We became good friends with some geological people in Leningrad. I was in Leningrad for more than a month in the wintertime editing some translations of Russian literature on the bauxite deposits, and so I had a marvelous chance to see the Russian ballet and some Russian opera.

I greatly enjoyed the Russian people. I think it's a terrible tragedy that we have this ideological warfare, because the Russian people themselves are wonderful people. It's just a shame that they're imprisoned in this Communist nonsense. But in those years, it was really interesting because it was truly a police state. People wouldn't talk to each other. They'd never discuss political matters for fear that the person to whom they were talking might even the day before have been impressed into the secret police. They had a way of forcing people into the secret police by threatening their families. If you wouldn't cooperate to spy on your friends, they'd send you to Siberia or even imprison or starve your family. So it was a situation where people found it difficult to talk confidentially even to their best friends.

Nevertheless, I found the Russian people to be very interesting, and I've always felt since that time that if they only had a reasonable chance, they'd make a fine contribution to world civilization. The way the common people of Russia throng the arts and patronize the opera and ballet is quite unusual, and the Russians, of course, have good physical capability. As I've said, our peasant workmen were excellent workmen. They know how to do hard work. They've got good brains. It's just regrettable that they have this ideology visited on them. Hopefully that's coming to an end now.

Swent: It may be changing now.

Just: That ended my connection with the aluminum company. I went around the world and spent two months with my father and mother, who were then in Japan. Studied a little bit of jiu jitsu and judo and came on home. That judo, jiu jitsu exposure led to an odd adventure down in New Mexico.

## New Mexico Interlude

When I had been at Wisconsin, one of the students in the mining school was named Emily Hahn. She and another girl, whose name was Dorothy Raper, were both enrolled in mining. They were the only women I ever knew who took up mining. Dorothy Raper had gone out to New Mexico. Emily Hahn had gone to work for an oil company in St. Louis, but it was strictly office work. She didn't like that, so she and Dorothy Raper were both working for a woman who lived in Ranchos de Taos, up near Taos, New Mexico and had a business of hand-painted greeting cards. When I got back from Japan, I bought an old car, and I stopped to see them in New Mexico. They took me up to Santa Fe. I might mention parenthetically that Emily Hahn became a well-known writer.

Swent: Yes, I was wondering if she was the one who became a writer about China?

Just: Yes. She wrote many articles for the New Yorker, and she wrote some well-known books. She wrote the book, The Soong Sisters, which as I recall it, was a best seller. During the war, she'd been interned in China. I remember one of her stories in the New Yorker. She became the concubine of a Japanese general. This story, which was called "Silicon Dioxide"--I can't remember how it got that title--it was an account of her living with this Japanese general.

These girls took me down to Santa Fe, and we went to the house of a writer whose name was Witter Bynner. Have you heard that name?

Swent: Yes, I have. Not for a long time. He was a poet, wasn't he?

Just: Well, he was in the literary field. Whether he was a poet or a writer I don't know. But he was putting on a party that evening, and he had several guests in for cocktails. Incidentally, the girls had warned me that he was a homosexual and that I shouldn't put up any kind of a fuss about this.

Anyway, he put on a very realistic exhibition of a Japanese gentleman committing harakiri because of a disgrace in the family. Then these girls happened to mention that I had just been taking jiu jitsu in Japan. Well, nothing would do but what I had to show off this talent. The young man that was living with Witter Bynner was my size and strength, and he wanted to take me on. I didn't want to do this, but they finally insisted on it. There was a group of maybe a dozen onlookers, the guests in the party. We went at it in this small room, about twelve by fifteen, something like that, and I could quickly tell that this fellow had had some experience in wrestling. That was probably why he was anxious to take me on. But I got a lock on his throat. He broke it; then I got another one. He passed out, and then a girl who was sitting up on the back of a sofa fainted from all the excitement. So here we had two unconscious people on our hands, and during the fight, we had knocked over a table full of glassware and liquor. That was all over the place. This display of brutality was such that it killed the party. The guests were all so chastened by this spectacle that within a few minutes they all went home. That was the end of the party. [laughs]

## Oil Promotion in Kansas, Tennessee, and Michigan

[Interview 2: February 22, 1989]##

Just: After leaving New Mexico, I returned to my home in Chicago, and shortly after, I undertook to promote some oil activities on my own. I became acquainted with a group of people in Chicago who were all wealthy businessmen, and they were willing to spend a little money exploring for oil.

I took a look at the area in Kansas around the town of Paoli, where oil was first discovered west of the Mississippi. A friend had written a report on that. I was not sufficiently impressed with that, but I did learn about some possibilities of very shallow oil production down in Tennessee in an area along the Obey River northeast of Nashville. A former professor from Northwestern, Elmsley Thomas, had done some geological studies down there and had a few small anticlinal structures mapped out. We drilled them without success. Then the oil field at Muskegon, Michigan was opening up, and I went over there. But we were a little late to get an attractive foothold against the competition, so we didn't undertake anything there.

About that time, a relative of one of my backers, from Manistee, Michigan, let us know about the fact that there had been some oil eruptions in that vicinity many years ago in the heyday of the lumber industry. Manistee was an important lumber town when Michigan was an active lumbering country. I'm referring to the southern peninsula. They had so much waste lumber, and they learned that they had salt underneath them. So they drilled for the salt in order to use the waste lumber to evaporate the salt water that was brought up.

Swent: You mean they burned the lumber?

Just: Yes, the waste. Those old wells, which were drilled by cable tools many years before, were drilled full of water, in other words, without casing. They had erupted a few times with oil. It was not impossible that they might have commercial oil and still not continue to flow against the countervailing hydrostatic pressure in the drill holes. So I went over there and was able to get some of the old saltwell logs and make a subsurface structural map. On rather meager information, I decided that we had some drilling objectives there.

We drilled three holes there to roughly three thousand feet as I recall, and in all cases they were unsuccessful. About that time the Depression was coming along, and my backers decided to pull in their horns. So I was stranded up in Manistee.

Swent: Let me just ask you more specifics about your arrangement with these backers. Were you hired on a fee basis or a percent basis?

Just: They simply supported me, and I don't actually recall the terms. But I must have had what you'd call a carried interest in case we found anything, but I got nothing but an ordinary wage. I can't remember what it was; few hundred dollars a month. They furnished me a car and my expenses.

Swent: You hired the drillers then as you needed them?

Just: Well, yes, after I had done my work, we hired some drilling people, and I simply watched over the work.

Swent: Then if you found nothing, you got nothing extra?

Just: That's right. As I said, I had a few savings from my Russian experiences, and I had been able to save some of my salary at that time, so I wasn't broke. As a matter of fact, I went without a job until the spring of '31, so I was the best part of a year without a job, as did many other people at that time.

# III A GEOLOGY TEACHER, 1931-1934

## Lehigh University

Just: Through Professor Leith of Wisconsin, I was offered a job at Lehigh University. Before I go on to that, I should mention that I met my wife in Manistee, and that was the greatest thing that ever happened to me. We had a wonderful marriage, and she was just a wonderful person.

Swent: How did you meet her?

Just: She lived in the town and was secretary to an insurance man there. We weren't married at the time, but we went together for roughly a year. Then I got this job at Lehigh. At Lehigh Professor Benjamin Miller, who was the head of the geology department, had some extra consulting work that he wanted to do, so I took over a class in economic geology, using Lindgren's famous book as a text. I also instituted a course in petroleum geology.

Swent: That's interesting. Lehigh had no course in petroleum geology?

Just: No, not to that time.

Swent: That's surprising to me.

Just: Well, that wasn't really oil country there in eastern Pennsylvania. Dr. Miller continued to teach a lecture course to beginning geology students. There were about 150 of them in this class, and they met twice a week. Every class day he gave them a ten-minute examination, and I had the job of correcting those papers. So I had three hundred papers a week to correct for that elementary group. Now, I mention this simply because I thought, and still think, it was striking the degree to which literacy at the college level had fallen from the time that I was in college roughly ten years earlier. Most of these students at Lehigh were from New York City, and their handling of the English language was very, very poor. That's a process which as far as I could tell you has been going on ever since, unfortunately.

That teaching was for the spring semester, as I recall. It was a semester system. Then I obtained a summer job with the Du Pont Company where the company wanted to drill an ilmenite property which they had up in Quebec. So I went up there for the summer and supervised the drilling of this ilmenite deposit and also made a magnetic survey. At that time, titanium was coming into favor as a paint pigment. The Du Pont people, being very much in the paint business, were looking for their own mineral resources to back it up. We drilled this titanium deposit near the town of Baie St. Paul, which is several miles downriver from Quebec. During that time, my girlfriend from Manistee, whose maiden name was Marian Elliott, came up there. We were married in Quebec City and had a kind of combined field job and honeymoon up in this French-speaking country area along the north bank of the St. Lawrence River.

## New Mexico School of Mines

I had been invited to go back to Lehigh as a permanent member of the faculty, but in the meantime I had been given an attractive offer to teach down at the School of Mines in Socorro, New Mexico. The idea of getting out in the wide open spaces was so appealing to me that I was able to get a release from Lehigh. So my wife and I bought a second-hand model A Ford and went to New Mexico.

Swent: How did this offer come to you? Did you have to write around and ask for these jobs, or did they come through your university connections?

Just: The offer to go to Du Pont, I was acquainted with Joe Gillson who was the chief geologist for the Du Pont company. He had been a Northwestern graduate several years before myself, and it was through him that I was offered that job. I don't recollect how I got wind of the New Mexico job. It must have been advertised somewhere, and I answered the ad, but I really don't remember.

Swent: Did you know anybody there?

Just: Yes, come to think of it. Dr. Sterling Talmage, who had been also at Northwestern as a faculty member. Later, he became the head of the geology department at the New Mexico School of Mines. But I don't think I heard of that job through him. That was a coincidence. Another man who was hired at the same time was also a Northwestern graduate named Claude Needham. Needham subsequently became president of the school.

Socorro was a little, old Mexican town. My wife and I had delusions about the scenery because I had been familiar with the canyon country up around Taos, and we weren't expecting to find just a flat country with mountains in view. But the broad plain of the river was just flat, and you couldn't see the river. You had to wander through the bosque [woods] about a mile to get from the town to the river, and it was just a desert Mexican town, with this small school there. The reason I mention this is my wife cried when we arrived, and she cried when she left.

Swent: It grew on you. Was Conrad Hilton there at that time?

Just: No, he had an aunt who ran a drugstore there, so we knew of the family. But he was already establishing a hotel business, although not nearly as famous as he later became. They had a hotel in El Paso.

Well, at the New Mexico School of Mines I was teaching petroleum geology. I taught oil well drilling, and I taught oil field production methods. I had a field course, taking students on field trips. New Mexico was a wonderful place for that because we had, you might say, geology in all directions. In spite of the limited scope of the community, we had a good time there. We made good friends, and as I've said, my wife cried when we left three years later.

Swent: Did you have many women students?

Just: No, there were no women students at that time. There were only about three hundred students in the school.

Swent: Were most of them from New Mexico?

Just: No, the bulk of them were outsiders.

Swent: Were there many foreign students?

Just: A very few. One of them, however, was a Turkish lad who became a lifelong friend, Ihsan Berent. He later went back to Turkey and headed up the government exploration effort which discovered oil in Turkey. He later went into private business and became quite a wealthy and influential citizen. He now lives part-time in Istanbul and part-time in Geneva, Switzerland, and we're still very good friends.

Swent: Did you have any other students you remember particularly well?

Just: Well, I remember Lon Chapin who went down and worked with the California Company in Texas. That, I believe, was an offshoot of what we now call Chevron here, in California. Most of those boys went on to successful careers, but my contacts with them didn't last very long. After three years at New Mexico, I felt I wanted to have a broader opportunity for the future.

Swent: What about the general instruction there, was it just technical? Did they do anything other than mining and geology?

Just: They had a chemistry department, an English department, mathematics and physics, and all that. But my work was entirely in the department of geology.

Swent: They had no liberal arts to speak of, did they?

Just: Our curricula were all technical curricula.

Swent: Were the students well prepared?

Just: In those years it was a school of rather low standards. They were so desperate to keep alive that the general scholastic standards were poor, and that was one of the reasons I didn't want to stay. I don't know anything about what's happened since. The school has grown. It has since become a generalized technology college, and I suspect that they've been able to pull up the standards.

During the summertime, the president of the school, Edgar Wells, was also the director of the state Bureau of Mines, and he gave me an assignment to work up in northeastern New Mexico in the vicinity of Taos. Part of the work was in an area near Ranchos de Taos, involving an old lithium property. It was a lithium-bearing pegmatite, a big one, and it had been pretty much mined out, so there was no activity there at the time. Later on, it was reopened as a source of optical calcite.

On a previous summer, the state had given an assignment to study that deposit to John Scopes, whom you may remember as the chap who was tried in the famous Tennessee "monkey trial" with

Clarence Darrow and William Jennings Bryan opposing each other. Scopes had been provided a sum of money by the people who backed him up in that Tennessee affair, and he went to the University of Chicago. As a graduate student there, he took on the geology of this area near Ranchos de Taos. It was in what we call the Picuris Mountains. Scopes apparently had no hard-rock geology background, and here he was dealing with Pre-Cambrian rocks. He misinterpreted the geology and then gave up on it.

So they had this partial report which they handed over to me, but actually, what I found there was a very interesting geological structure where these intensely folded Pre-Cambrian rocks were striking east-west, which is across the trend of the Rockies' north-south folding. Of course, it was entirely Pre-Cambrian. The Pre-Cambrian went under a younger cover to the west and, as a matter of fact, in all directions, but reappeared again over in the Petaca district, which was the old mica district out west of Taos. This district had also been pretty much mined out, so there were no active mica mines left when I worked there. I'm not aware that any have ever been revived. But here we had three Pre-Cambrian exposures in northeastern New Mexico which indicated a trend from the northeast-southwest at Picuris Peak. Then it swung northward through the Petaca district and before it went underground again, started westward.

Later on, as I indicated in my report, I had visited with Dr. Ian Campbell, who was then working with a colleague on the Vishnu schists in the bottom of the Grand Canyon. There they had a northeast-southwest trend of these Pre-Cambrian structures. I can see the idea that basically this was probably all part of a Proterozoic mountain system that probably extended all the way across the continent from the St. Lawrence region.

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Campbell and his associate from Cal Tech [California Institute of Technology] didn't agree with that, but I mentioned it in my little report on my work in New Mexico [Just, Evan, "Geology and Economic Features of the Pegmatites of Taos and Rio Arriba Counties, New Mexico," New Mexico State Bureau of Mines and Mineral Resources Bulletin, No. 13, 1937]. But that's the last I ever heard of it. I still believe it's probably true, that there's a great former Pre-Cambrian range that crosses the continent from the St. Lawrence region to our Southwest. Incidentally, this was also partly confirmed by studies of the Northwestern geology department in the Sawatch Range of Colorado. The Pre-Cambrian there has that same northeast-southwest trend of isoclinal folds.

Swent: Had you seen any of these same things up in Quebec?

Just: No, I was just aware of them from the literature.

Swent: How do you resolve such a controversy?

Just: Well, in this case there was no resolution. Ian's associate was a dogmatic type, and the long-standing Grand Canyon intepretation was good enough for him. This portrayed the intensely folded Vishnu schist as Archeozoic and the gently folded Unkar-Chuar series as Proterozoic, leaving no room for intense Proterozoic folding. I doubt that he had any idea of the complications of the Proterozoic that had been worked out in the Canadian Shield. Some age problems could be worked out, and I suppose have been solved by radioactive dating, but that was not done in those days. Also the Vishnu schists may possibly be Archeozoic, but folded later.

## IV A PETROLEUM ENGINEER, CARTER OIL COMPANY, 1934-1937

Just: After three years of teaching at Socorro, I decided I wanted to get back into the oil industry, but I decided to go into production as being a more stable area than geology. After first trying California and being able to get nothing but a roustabout's job, I went back to Oklahoma.

Swent: Where did you go in California?

Just: Los Angeles. I went back to Oklahoma City, and I got a job with the Carter Oil Company which is an arm of what was then Standard of New Jersey, now called Exxon. Carter was the Oklahoma-Kansas subsidiary. Carter had just purchased a large group of wells in the Oklahoma City pool from the Slick Oil Company. They sent me there as assistant to a senior petroleum engineer. His name was Ray Kollar, and he and I were the, you might say, sole representatives of the Carter Company. All the rest were the former Slick employees who had been retained when the Slick holdings were sold to the Carter Company. This was a quite interesting experience. We had some three hundred important producing wells, all of which had passed the natural flow stage and were being operated on gas lift. But it was high production and quite an important operation.

Swent: What were you actually doing?

Just: I was listed as a petroleum engineer, checking the production and the gas-oil ratios.

Swent: At the well head?

Just: Yes. I was not in charge; I was simply another petroleum engineer. But with 130 wells going, there was always something to do, and it was quite an interesting experience. With gas lift, we not only would blow off the gas that came with the oil, which was considerable--

Swent: You mean burn it?

Just: No, blow it off into the air. But also the gas that we injected for lifting purposes. The amount of gas that we blew off in Oklahoma City is almost unbelievable. Our typical wells each had four ten-inch, what we call risers, vertical pipes. When a well was on production there was so much gas coming out of these four ten-inch pipes that you had to scream at somebody to be heard. It was absolutely deafening. So the volumes of gas we were blowing away and wasting into the air, you might say they would have furnished Oklahoma City with fuel until the end of time, almost.

Swent: It makes you sick to think of it today, doesn't it?

Just: Yes, it does. But you know, in many places in the world we're still blowing the gas away that way. Take in Saudi Arabia and Alaska, all that immense production. They blow the gas into the air. It's common practice where you haven't got a market for the gas, except in a few places where they have what they call unit production. In some cases they put the gas back in the ground to maintain the reservoir energy.

Swent: The gas that you used for lifting--was this the same gas that you diverted back in?

Just: Part of it, yes. We had the lines running around through the oil fields where this gas was under five hundred pounds pressure. Incidentally, one of the remarkable things was most of the oil production was down in a poor section of the city, and these were largely Negro families. There were dozens of them who were tapping into our five-hundred-pound line for their own gas requirements. Why a great number of them never blew themselves up, I never understood to this day.

Swent: Using it for their stoves and heaters?

Just: Yes. We had a constant problem of getting rid of these parasites. It wasn't so much that we minded their taking the gas, but the liability, you know, of their killing themselves by this procedure was too serious.

Swent: Was there anybody at that time thinking that this was an awful waste?

Just: Yes; however, there was really no alternative; if you wanted to produce the oil, you had to produce the gas. There was a very limited market for the gas. The market was an insignificant fraction of the amount of gas that we had to produce in order to produce the oil. As I said, that was common practice in those days. I started there in '34 and worked there until '37. So I spent three years with Carter.

Swent: Right in the middle of the Great Depression?

Just: Yes, although my depression had been earlier.

Swent: Were those the years of the Dust Bowl in Oklahoma?

Just: Yes. As a matter of fact, I can well remember a couple of occasions when the sky was black with dust, and even in our living room with the windows shut, we had a half an inch of dust on our dining room table. After about a year in Oklahoma City, the Carter Company transferred me. I became chief engineer in their Seminole division, which was their largest division. We had about five oil pools under management. Some were well past their peak and on the pump, and some were being lifted by gas lift. Also, we had natural flow down in the Fitts pool. So we had quite a gamut of different types of production. We also had a small pool up in the north end of the division where they were undertaking a unit experiment, putting the gas back into the ground. This was a large division, and we had, as I've said, these different kinds of production problems. We did the surveying for the wells and the bottom hole pressures and the gas-oil ratios. Then part of my job was to write the weekly report of the division to the head office. The production superintendent people were never very inclined toward the literary side, so that always fell on the engineer to write the report.

Those were very interesting years. We lived in the company camp near the town of Seminole, and I really enjoyed that oil field life.

Swent: Was your home provided for you?

Just: Yes, the company provided a house. It was a whole camp full of houses, and our fuel and lights were free. They didn't feed us.

Swent: Medical care?

Just: No, but medical care was not expected in those years. You looked after yourself.

Swent: What were you paid; do you remember?

Just: I started out at $150 a month for Carter, and I had some raises, of course, in the meantime. But I don't remember what I was getting at Seminole. It was something above that, but not an awful lot.

Swent: $150 in 1934 was a handsome salary, wasn't it?

Just: I wasn't at all dissatisfied. I had a good future with the company, I'm sure, because actually, our chief engineer in Tulsa went on to become president of two affiliates of Standard in New Jersey: the one down in Colombia and the one up in Canada, Imperial Oil. Later he became president of the main company in New York and then chairman of the board, Mike Haider. In fact, he retired out here in Atherton and died only a few years ago. He was also a president of the AIME [American Institute of Mining, Metallurgical, and Petroleum Engineers].

My best assistant, who succeeded me when I left Carter, subsequently became president of the Humble Oil Company and also a director of the main company in New York.

Swent: What was his name?

Just: Mike Wright, a capable engineer. But it was a time when you might say engineering came into its own in those subsequent years. The company had a tremendous expansion, so I'm sure that I would have had a marvelous opportunity had I stayed.

I would also like to say, at the same time, that really it is a wonderful company. It was a company that treated its employees very, very well. They had a fine investment plan where they contributed to the employee's account. They also had an employee representation plan so a man could always have a hearing if he thought he was unjustly fired or otherwise had a grievance at his job.

Actually, I always thought it was a terrible shame that when the Wagner Act came along in the Roosevelt years, they outlawed these so-called company unions because this thing was really a fair deal. The employee with a grievance could appeal through four or five stages up to topmost authority, and at no time was he ever overbalanced by management in the judicial process. It was a terrible pain in the neck to the supervisors because any time they'd discipline a man, they'd have to fear the possibility they'd have to justify it endlessly, you might say. But it was a fair and square thing, and that was just part of its being a very fine company run by very fine people. I always have thought it's a shame how often companies like that are vilified in the public mind.

Now, there's an interesting story behind that attitude in the Standard of New Jersey company. The Rockefellers in prior years had dominated that company, of course. But the Rockefellers also, in earlier years, had dominated the Colorado Fuel and Iron Company, and that company went through a bloody strike. When they got through with it, the Rockefeller people decided they were never going to go through that kind of a thing again. So they put in this employee representation plan which leaned over backward to give the employee every chance to be heard. As I said, it was a bugaboo to the supervisors, but it was fair. But the Roosevelt administration, the Wagner Act people, just considered that to be a so-called company union and to hell with it.

Swent: How was this company policy made clear to you as a supervisor?

Just: Well, I wasn't really a supervisor. I had a half a dozen engineers, but I didn't supervise the production people, you know, the fellows out where the wells were. I might say, incidentally, up to that time engineers always were at a disadvantage in the oil industry. If you take, for example, the fellows that I inherited when I became head of that group. These young fellows really hated to go out into the field because they were not really tolerated by the regular line production men. This was partly, I think, because old-time production men have always been a little distrustful of engineers, and partly, I think, there was a certain amount of fear in anticipation that eventually they would lose out to the educated man as far as promotion was concerned. At any rate, there was a jealousy there, and these boys really almost hated to go to do their work in the field because they were not warmly received.

I made it part of my business to go out and make friends with these line production men, the farm bosses and other production employees, and we pretty much changed that attitude. Generally speaking, the whole industry about that time, you might say it was the beginning of the recognition of technology in the oil industry. Most practical oil field men up to about that time didn't think much of either geologists or engineers. The way I have explained the careers of these two men, one of whom was just above me and one of whom was just below me, was an indication of how technology came to the fore in that industry.

Swent: It was an exciting time for you then?

Just: It was really interesting, and I hated to leave the oil field, I enjoyed it so much. It was a great life and a great company.

Swent: Did your wife enjoy it also?

Just: Yes, she was always willing to try something new, and she was an adventurer and a good sport.

Swent: Did you have children then?

Just: No, we never did have children of our own. We adopted a daughter some years later.

Another thing I might mention from those oil field days is that at Oklahoma City I met S. F. Shaw. He was a quite elderly engineer, a mining engineer, and some years before, when the Seminole area was in what we call flush production, the Carter Company had hired him to apply gas lift to the oil fields. So he was the father of the use of gas lift. He had learned all about this from unwatering old mines in Mexico by air lift. His contribution to the productivity of the Carter Company in those years was fantastic. I don't believe that the importance of his contribution has ever been recognized, but he was a great engineer. At the time that I was working at Oklahoma City, he was working with a small oil company--Westgate--which had four wells down in the heart of the Wilcox pool. The production he got out of those four wells was absolutely phenomenal.

I didn't leave the oil field because I wanted to, but a friend of mine with whom I had first become acquainted in Kentucky and later on at Wisconsin where we were fellow students, M.D. Harbaugh--all of us called him "Doc" Harbaugh--he was secretary of the Tri-State Ore Producers Association. He was moving on to a bigger job of the same nature as executive secretary of the Lake Superior Iron Ore Association, and he asked me to come and take his job in the Tri-State District up in northeastern Oklahoma and adjacent Kansas and Missouri. After a long, agonizing period of questioning, I did leave. I can't say that I regret it or ever did, because I've had an interesting, rewarding life since. But I'm sure I left a fine opportunity behind when I left the oil fields, and I certainly left a life which I thoroughly enjoyed.

Swent: Those are hard decisions to make, aren't they?

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## V SECRETARY, TRI-STATE ZINC AND LEAD ORE PRODUCERS ASSOCIATION, 1937-1941

Swent: So you had to make a hard decision to leave the oil fields?

Just: Yes, in 1937 I decided to go to the Tri-State District.

Swent: Where did you live then?

Just: I lived in the town of Miami, Oklahoma, which is up in the northeastern corner of the state. The Tri-State District had been in its earlier years an enormously productive zinc field with, you might say, contributory lead. Even when it was considerably depleted in my time, it was still producing 40 percent of the zinc produced in the country and 10 percent of the country's lead. So it was still an important mining district, even though it was well past its heyday. This field had started way back in the mid-century before that. In the early years, it was the Joplin District up in Missouri. Incidentally, it furnished a good deal of the lead, along with the Illinois-Wisconsin District and the Southeast Missouri District, for the Northern forces in the Civil War. So it was an old district, but in those earlier years was entirely up in Missouri.

Along about 1915, there was some evidence of lead outcroppings down in the Oklahoma area. Arthur Bendelari was sent down to do some drilling in Oklahoma. They had done this drilling, and it was a failure. This was for the Eagle-Picher Company. So the drilling rigs started on their way home to the Joplin area, and one got stuck in the mud in a rainy spell, and the driller asked if because of the extra cost of that situation, would Bendelari let him drill a hole where he was stuck. They drilled into the Picher field, which was a part of the bigger field, and eventually the most productive of all. In other words, it opened up a tremendous mining district out on the flat, prairie country where there had been almost no evidence of mineralization just because of this fortuitous circumstance that the driller got stuck in the mud.

## Lobbying

The district had gone through a great period of high productivity. It was economically marginal, although it still had a quite large production. This association of which I was executive secretary had several functions. One was to lobby in the state legislatures to help prevent our being burdensomely taxed.

Oklahoma and Kansas had oil production [as well as mines], particularly Oklahoma. They had levied a 5 percent production tax on oil. In the case of mining, the crude product was the ore, but the ore was concentrated before you had a point of sale. So the first place where you could identify value commercially was when concentrates were sold. The legislature always had a tendency to want to put a 5 percent production tax on that. Well, as a matter of fact, an equivalent production tax was a quarter of one percent on the concentrates, considering the ratio of concentration and milling costs.

Swent: If they levied 5 percent on the ore--.

Just: Yes, it would be more or less equivalent to what we actually had, a quarter percent on the concentrates. But that was always under a certain amount of attack by people hungry for new tax money.

Swent: They wanted to tax oil and minerals in the same way.

Just: Yes. You know, in the minds of most people, oil or mining means wealth automatically, and there was little concept that there's such a thing as a marginal operation. Then there was also another type of attack, and that was that certain legislators--particularly in Oklahoma which had a lower grade legislature, at that time, anyway--some people would simply institute these punitive tax bills as a way of trying to collect some payoff money from a given industry. So we had both the general hunger for new taxes by a legislative body and a certain amount of corruption to cope with, too.

Swent: You were dealing with three legislatures?

Just: Three.

Swent: There's Missouri, Oklahoma--.

Just: And Kansas.

Swent: Kansas. Did they all meet annually at that time?

Just: Oh, yes.

Swent: Did they meet at different times, so that you could deal with them separately?

Just: Well, these issues were not continuous, but they were coming up all the time. So I had to make an appearance at least once a year in Oklahoma City and Topeka. Part of the effort--we did something that was quite unusual. In fact, I've never heard of it anywhere else. In order to help defend the industry, our association collected confidential cost information from all the producers, and we averaged them out. We were able to publish the averages, and that was quite important in the defense of our economic position against burdensome taxation.

Swent: Had this been done before, or was this something you began?

Just: I didn't begin it, no. I just carried it on. We had a statistician--.

Swent: That was a sign of trust in the association, wasn't it?

## Protecting the Health of Miners

Just: Yes, yes. Then we also had an engineer who counted the dust in the mines. The Tri-State District was the place in North America where silicosis was first identified. The ore is very siliceous, and many years before, about 1912, Dr. Sayers of the United States Health Service had studied the tubercular condition in the miners of the Tri-State District, which was almost incredible in the light of our present knowledge. Dr. Sayers told me himself that the typical life of a miner along around 1910 and 1912 was five years. These guys would get silicotuberculosis, but there was where they recognized scientifically that siliceous dust was the source of it. Of course, with all of that, they had developed a considerable seed bed of tuberculosis to boot, you see. So these men would actually die of tuberculosis aggravated by silicosis. Now, a similar discovery was made simultaneously in the South African gold fields, and silicate was identified as the culprit of this great plague of miner's consumption.

Swent: That's what it was called then, wasn't it?

Just: Yes.

Swent: What about lead poisoning?

Just: Oh, that is not a particular danger to the miner.

Swent: Did you work in cooperation with an oil association as well?

Just: With an oil association? No. Oftentimes we had a common interest. We would defend percentage depletion, for example, because we both had an interest in that. That's a federal problem, and so our association, along with several other regional associations, would participate with the American Mining Congress in helping hold the fort for percentage depletion. With the oil industry--actually, we were the tail on the kite in that battle because the oil industry has so much more money and much greater influence. They were influential in so many states.

## Political Problems of the Mining Industry

This might be a point where I could mention my own feelings about the political problems of the mining industry. The mining industry doesn't have many states where the well-being of the industry is important to the politicians. You could almost say during my time that in Nevada, to some extent Idaho, and Arizona, the politicians from those states really went to work to help the mining industry. In other words, they were mining conscious, but practically anywhere else in the country, mining just didn't muster much political interest. It wasn't big enough, and it wasn't wealthy enough.

## The Need for a National Mineral Policy

I'm jumping ahead to some extent, but when I was editor of

E and MJ [Engineering and Mining Journal], I wrote an article which, incidentally, won a national prize, called "A National Mineral Policy." I spelled out what I thought should be the precepts of a national mineral policy. This subject subsequently came up time and time again. You'll remember that Jim Boyd tried very hard to establish a national mineral policy.[1]

Well, it's something which Congress would always give a limited amount of lip service to, and in Boyd's time they actually passed a law. But the law never was effective for the simple reason that we didn't have the votes. On top of that, we didn't have the money to buy enough politicians, because that's how you get somewhere in legislative matters. You don't get anywhere to speak of with the purity of your arguments. You get there because you've bought certain politicians or because in many cases where an industry is important in a state, the politicians will help to defend it.

Mining, in general, is not that big, and it doesn't have that kind of an influence in many states. Even in Arizona today, mining is a minority group, and that's the greatest non-ferrous metal mining state in the country. In Minnesota with all its great iron ranges, mining was always under attack, it was more on the defensive than it was in a seat of power. So the simple fact is that if you want to get action, either you have to buy a certain number of politicians or there has to be a natural impulse for them to help you because you're important in their bailiwicks. Maybe you remember Will Rogers's famous statement, "We have the best Congress money can buy." Mining is unfortunate in that respect, and that's the basic reason why we never get anything done in the way of a national mineral policy.

## The Need for a Percentage Depletion Tax Allowance

It's the same reason we were always under a certain amount of attack on percentage depletion. The Treasury Department was always against percentage depletion. To this day, as far as I know, they are. They wanted to reduce depletion to what the accountant calls cost depletion. The basic difference is that percentage depletion is based upon an approximation of the value of the resource, which should be recouped as a capital asset without taxes. Cost depletion doesn't give you back the value; it gives you back the cost, which is, by the very nature of things, likely to be much less than the value because you spend an awful lot of unredeemed costs before you find the good one that has value.

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[1] James Boyd, Minerals and Critical Materials Management: Military and Government Administrator and Mining Executive, 1941-1987, an oral history conducted in 1986 by Eleanor Swent for the Western Mining in the Twentieth Century Series, Regional Oral History Office, The Bancroft Library, University of California, Berkeley 94720.

So the basic premise of percentage depletion is that an ore body or a natural resource like petroleum or timber are capital assets, and they should be considered as capital and that their value should be returnable before being taxed. In other words, if we had a proper tax system, the miner would be able to recoup the value of his ore body as profit before becoming taxable, and then his profits should be taxable partly as capital gains. That is, that portion of the profit which is due to the resource itself.

Congress and the public are not willing to wait until you have recovered your value before they tax you. You'll get taxed every year that you make a profit, and so this percentage depletion was basically an approximation to recoup the value of your raw material incrementally while being taxed. It was a principle I believe in and have always fought for. The attacks on percentage depletion have always tended to create a condition of burdensome taxation on these resource industries.

Swent: What about severance tax?

Just: That was what we had in the states, you see. They tax, what they called in Oklahoma, a gross production tax. They taxed oil 5 percent of the value of the basic crude material. In our case, based upon the arithmetic I've already mentioned, they taxed us one-fourth of one percent on the concentrates. But you see, whereas the ore was something like 2 percent zinc values, the zinc concentrates were 60 to 65 percent zinc. Considering recovery losses (80 percent recovery), the miner had to mine and mill about thirty tons of ore to produce a ton of zinc concentrates, so the cost of mining and milling these thirty tons was imbedded in the value of a ton of concentrate. Another way to put it is that the contribution of the resource itself to the concentrate price was relatively small. One half percent of the ore was lead and the concentrates 95 percent.

Swent: Did you make any progress, or were you just doing a holding action the whole time?

Just: Well, it was a holding action, but during my time, we held the fort, so to speak. We always were able to convince Congress and these legislatures that it was a legitimate position.

Swent: This was your main job then, the lobbying with the legislatures?

Just: And with Congress, although the character of it was different. In the legislatures primarily, it had to do with fighting off burdensome production taxes. Also, a certain amount of defense of the employers' liability insurance situation.

Swent: Did they have workmen's compensation laws in those days?

Just: Yes. And as a matter of fact, as I recall it, the tax in Oklahoma was 10 percent of payroll. It was no small thing.

## Health and Welfare Projects

Also, in our association we ran a clinic. We examined every workman of the members twice a year for silicosis. So we had, you might say, two functions with regard to this dust danger. We provided the engineer to go through the mines and sample the dust conditions. That was a full-time job. We also provided the clinic to be sure that the men were not developing silicosis. A certain amount of fibrosis in the lungs is tolerable, but you don't want to work a man in an underground siliceous mine if he's developing silicosis.

Swent: So you were doing legislative action and health action? Those are both ambitious programs.

Just: Yes, it was quite an active operation. And another thing, we had a welfare nurse. We kept a welfare nurse full time, without regard to employment or anything else, who just looked after the poor people of the mining district. She was very effective. She helped a lot of people in a health way. Often, for example, she'd be taking mothers and babies down to Oklahoma City or Tulsa for hospital attention. It was really quite a nice thing. It was simply a charitable operation.

Swent: How big was your constituency; how many companies belonged to the association?

Just: I don't remember. There weren't as many as we would have liked because many of the small operators wouldn't contribute. We had dues they had to pay, and so many of the very small operators didn't contribute. We had about, something like fifteen members, I would say.

Swent: That's companies?

Just: Yes. Some were mining companies, and some were tailings retreatment operations. In those years, they were rerunning some great piles of the old tailings and were able to make money out of better technology than had been used in the earlier days.

## The Reciprocal Trade Program; Tariff on Zinc

One of the big events that came up during my time there was this Reciprocal Trade Program. That was a federal program. It was the brainchild and darling of Roosevelt's secretary of state, Cordell Hull, who was a very eminent man and a devoted free trader. I would say in commenting on him, I think he was a great citizen, and I think that in general, his reciprocal trade program, which was a way of lowering tariffs, did the country a great deal of good.

We happened to be an industry where they had picked on to lower the tariff on zinc, but they did it against their own ground rules. They had told the public and all interested parties that they would only make these trades with the principal source of imports, and without harm to domestic producers. In our case, they made it with Canada, which was not the principal source of imports. Mexico and Belgium were the principal sources, and so they traded away, you might say--the concept was that if you traded with the principal source of imports, you got something back reciprocally from them. But all other importers were given a free ride, you see, for no trade. So the two principal ones got under the wire for nothing. So the State Department violated its own rules when they hit zinc in an agreement with Canada, and that's what we were protesting. We were not protesting the reciprocal trade program at large. Our district, in particular, was a marginal district, and the tariff was very important to us. So this was a severe blow, and what we were contesting, as I've said, was their violation of their own rules.

Swent: This was the State Department?

Just: Yes, they ran it.

Swent: They didn't consult with you at all before they did this?

Just: Oh, we beat ourselves to death. I even went to Washington and rented an apartment for three months. Along with the American Zinc Institute, we fought this battle desperately, and we just made a nuisance of ourselves around the State Department. But there was a zealotry to this reciprocal trade business. Why they ever picked out zinc, which was the weaker of the three principal non-ferrous minerals, I don't know to this day.

Swent: Copper, lead, and zinc?

Just: Copper, lead, and zinc, yes. But zinc in those years was the weakest of the lot economically.

Swent: What was reciprocal?

Just: For example with Canada, they set up a trade agreement with Canada. They would give, and we would give. It would be a bargain to lower tariffs on both sides.

Swent: But we had a tariff on zinc coming in?

Just: Yes.

Swent: And there was another tariff on something going out that they wanted?

Just: Yes, that is, that we wanted to cut. We wanted to sell something to Canada, and they would reduce their tariff as a trading matter. But the United States policy was to generalize this treatment to the whole world except for certain countries which are, in effect, proscribed. For example--

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Just: The Soviet Union today is excluded from our reciprocal trade treatment; in certain instances, we exclude certain countries. But broadly speaking, we generalize the concessions we have made to any country to all other countries. It's called most favored nation treatment, and we have most favored nation treaties with most of the countries of the world, certainly most of the industrialized countries.

Swent: Did they do anything about the tariffs for copper and lead?

Just: No, they didn't hit lead, and there was a tax on copper, somewhat different from an ordinary tariff. The copper tax was not affected, as I recall it.

Swent: Were we net importers of any of those minerals?

Just: Oh, yes. We were importers of all of them.

Swent: We didn't export any?

Just: Well, there's always a certain amount of trade back and forth, yes. That was true in zinc, also. But we were net importers of all of those metals. We were more self-sufficient in copper than in anything else, but we were considerably more self-sufficient in lead than we were in zinc. But the profitability of those industries was greater. Zinc was the weak sister in terms of profit.

Swent: The Second World War was coming on. Were you aware of this and concerned about it?

Just: In those years, it wasn't anticipated.

Swent: So this was not a strategic consideration?

Just: No. The matter of tariff protection as a protection of national self-sufficiency for a national emergency has been an old, old argument. But we weren't anticipating war in those years.

Swent: So you weren't using that argument?

Just: Only as a kind of a broad generalization, but I can't recall anybody up to 1937, who foresaw the European war. Although, of course, Hitler was becoming rather ominous in Europe by that time. But if you recall even later that that, Mr. Neville Chamberlain settled with Hitler over what he called peace in our time, and he thought it was a great accomplishment. That was at least a year or two after that. So even the British thought that they were preserving peace in 1938.

Swent: You were with the Tri-State Association from 1937 until 1941?

Just: Yes.

Swent: Did you have a publication?

Just: No, although I spoke at a good many mining meetings. I had articles in the Mining Congress Journal.

Swent: But the association itself had no publications?

Just: No. In 1941, Dr. H. C. Parmelee, who was editor of the Engineering and Mining Journal, approached me and asked me if I would be willing to consider becoming his successor at Engineering and Mining Journal. I thought about that very seriously because that was, to my mind, a very prestigious job. In all those years up to that time, the Engineering and Mining Journal's second name was the bible of the mining industry. It had a good deal of influence. It had had some very talented men as editor, and it had provided good leadership, to the extent that a publication can do so, to the mining industry. So I recognized it was a prestigious job and a job where one could really serve with honor, you might say. But at the same time, I dreaded the idea of going back to a big city, and I hated to leave my mining friends in the Tri-State District. So I actually took two whole months to make up my mind before I could give Dr. Parmelee an answer, but finally I did consent. So off we went to New York.

## VI EDITOR, ENGINEERING AND MINING JOURNAL, 1941-1952

### Editorial Policies

Swent: You were actually listed at first on the masthead as Washington editor.

Just: I was an associate editor for about a year, but it was always understood that I was the designate. I was simply there to learn the business, so to speak.

Swent: Did you spend much of your time in Washington?

Just: During the war, yes. But I never was headquartered in Washington, and I can't recollect that I was ever what you'd call a Washington editor.

Swent: There was a column or a page called "Washington Reflections." Did you have anything to do with that?

Just: I edited it. But the material came from the company's Washington Bureau.

Swent: So you moved back. Did you live right in New York City?

Just: No, we first lived in Bronxville, which is a suburb, and then later on after I had been in Washington--I mean for the government--we moved to Scarsdale. So I never actually lived in the city.

Swent: You commuted down every day?

Just: Yes.

Swent: This was a McGraw-Hill publication, and what was its position then? For example, what would be your relationship with the Mining Congress? The Mining Congress also puts out a magazine.

Just: Yes, well, in a certain sense we were competitors. But I had been working in concert with the Mining Congress for so long in my Tri-State years that I was always friendly with them, and I was always friendly with the editor. So there was never any jealousy of any kind.

Swent: There's also Mining Engineering magazine put out by the Society of Mining Engineers of AIME.

Just: That's right. The same thing is true. They competed for advertising, but there never was any rivalry from an editorial point of view. I don't think there was at any time, certainly neither in my time or any other time that I know about. I'd say from both sides we always took a larger point of view. We all served the mining industry.

Swent: What about your publication of technical articles; how did you get those articles?

Just: We wrote some of them, and we'd simply scour --we'd learn about people who were doing things at the different conventions or in our travels. We moved around a good deal as editors. For example, in my own case, I visited most of the mines of the country.

Swent: And of some other countries.

Just: Yes, to some extent. So I knew the mining fraternity quite well in those years and was well known to them. But going back to the relationship between these publications, Engineering and Mining Journal, while a relatively small publication in McGraw-Hill, had much more advertising than the combined advertising of those other publications. McGraw-Hill had its own very effective sales force, and the Mining Congress or the AIME never had a large sales force. So they were simply, you might say, overwhelmed in the advertising field by the strength of McGraw-Hill's selling operation.

Swent: Did this ever put any editorial pressure on you?

Just: No, that's one thing I would like to say for McGraw-Hill, that at no time did they ever give the slightest hint as to what our editorial policy ought to be. Never at any time. When I was introduced to the president, I told him that I regarded E & MJ as the property of the mining industry, not McGraw-Hill. That pleased him.

It was another great organization. Interestingly enough, we were not by any means the strongest of the publications, but we were the oldest. In the whole stable of McGraw-Hill, ours was the oldest publication, but they had two mining publications. One was Coal Age, devoted exclusively to coal, and then ourselves which was devoted to all other aspects of what we now call metal and nonmetallic mining industries. They were both, I would say from a journalistic point of view, reasonably successful commercial ventures. Not big stars in the publishing field from a standpoint of gross income or anything like that, but good, solid publications.

I think we had the benefit--you might put it this way, I was able to serve my own conscience and my loyalty to the mining industry and to the country without ever any pushing by management. I did my best to be helpful to the mining industry and oftentimes by taking positions that were not the most popular that might have existed but that I felt were in the long range interests of the industry.

Swent: Can you give an example of a position you took that was not popular?

Just: For example, I used to preach that we wouldn't get anywhere by trying to build a "Chinese wall" of tariff protection around the country. We had to face the fact that the ore deposits of this country were being depleted and that whether we liked it or not, there were going to be imports. We'd better learn to live with it rather than fight selfishly for conditions which would be adverse to the best interests of the country. I always tried to take what you might call the larger view from the standpoint of the long range interests of the industry.

Up to about that time, that was not too common in business publications. The typical business publication was blindly loyal to what you might call the whims or current attitudes of their readership. Now, McGraw-Hill was a cut above that, and as far as I can tell you, throughout the organization, they had a higher concept of leadership. In the case of the mining industry, I think that we had a special advantage because I think mining people are a little bit broader in their viewpoint than a great many people.

Swent: They often tend to be international in their outlook.

Just: Yes, and so it was a little bit easier to take what I'd call a long range, publicly conscious position without offending the readership. Whereas in a good many business areas, if you weren't slavishly dedicated to their prejudices, you were no good. The mining industry, I think, always respected sincerity, and well, they're, shall I say, a little larger than life compared to the business world in general.

I'd say the same thing of the oil industry. I feel that in my time it's been a great privilege to live in the mining and oil fraternities. They're great people to live with and to be of. You know something about that. You say your father was a mining engineer.

Swent: My father, my father-in-law, and my husband.

Just: Do you recognize what I'm trying to say?

Swent: Yes, I certainly do.

Just: When I say this, I want to make it clear that I was not saying anything with regard to these rival publications in the mining field. I think the Mining Congress has been several cuts above your typical Washington lobby in terms of their statesman-like attitude in facing its problems. The same is true with the engineering societies. They've always had good leadership, and their publications have never been cheap, if you get my point, in terms of editorial attitude.

Swent: I was wondering if you were ever put under any pressure? For example, you were publishing articles about processes in various mills and mines all over the world. Was there ever any time when you decided to reject an article for some reason because it wasn't--?

Just: Wasn't in conformance with the well-being of our advertisers? No.

Swent: Perhaps, or because you felt that it wasn't true where people tried to push their enterprise through an article that you thought glorified it unduly?

Just: We never had that kind of a problem. I can't remember ever having that kind of a problem.

Swent: You know, there are lots of promoters in the mining world also.

Just: It never got to us, and the advertisers never--I can't remember that there was ever a complaint from an advertiser against any of our editorial policies.

Swent: Well, for example, I know from my own experience that everybody always had complete trust in your articles. If there was an article about a new mining machine, people really took that as truth. But there might have been cases where articles were submitted about machines that weren't so good.

Just: No. We simply tried to serve what, in our minds, was the best interest of the mining industry. I can't recall that we ever suppressed anything.

Swent: You printed everything that ever came in to you?

Just: That we thought was worth printing.

Swent: Okay, how did you decide that? There must have been articles that people sent you that you didn't print.

Just: Well, I can tell you an interesting story in that context. The famous engineer, D. C. Jackling, who was the father of the porphyry coppers, thought he could duplicate his achievements in the iron ore field. He went up to Minnesota--.

Swent: This was long before your time, however?

Just: Yes. He leased a big area on the east end of the Mesabi Range where the ore bodies had become magnetized by the nearby intrusion of the Duluth gabbro. He started an enterprise which was known as Mesabi Iron Company. Well, it was before its time. There was so much high grade direct-shipping ore that it simply didn't work. His idea of a mass mining operation and a mass milling operation with a simple milling scheme--in this case, magnetic separation--it didn't work in his time.

So the operation died, but the organization and the lease were kept alive by the surviving owners. The Mudd family of Cyprus Mines were one of the backers of this thing, which held on to their shares all those years. Later on, I remember R. C. Allen, who had been head of the Geological Survey of Michigan for several years and was down on the War Production Board. During the war, he had left Michigan to join the Oglebay-Norton Company, which was a big service organization operating ships and some mines in the Lake Superior mining region. He told me that his final dream was to go back and reorganize that taconite industry, and he was instrumental in doing it. Oglebay-Norton put together a group of four large steel companies which organized what was known, and is still known, as the Reserve Mining Company. They revived this thing, and they made it go. As a matter of fact, it became a tremendous success eventually, although it has been shut down recently because of a pollution problem.

There were a couple of mining engineers who originally came from Boston named the Hoffman brothers who had gone to Canada and become rather prominent in mining activities in Canada. The Hoffman brothers had taken a look at this Mesabi Iron, which was the lessor to Reserve Mining, you see. So they had a royalty status with the operating group. As I recall it, the division was to be that Mesabi Iron was to get one-third of the net profits.

The Hoffman brothers were smart enough to think there was a future in this concentration of iron ore, and they bought heavily into Mesabi Iron. One of them wrote an article simply expressing faith in the future of taconite and giving certain reasons for it. This paper was submitted to the AIME, which, as you probably realize, hands papers to different committees. In this case, it was submitted to the iron ore metallurgical group, in other words, the consumers of iron ore. The metallurgical group expressed the opinion that taconite was a flash in the pan and had no future, and therefore, they recommended against the publication of the article. So the Hoffman brothers came to me.

Swent: This was for publication in the Mining Engineering magazine?

Just: They submitted it for publication in Mining Engineering. Now, Mining Engineering, per se, did not reject it, but the committee advised against publishing it. So that amounted to rejection; it was rejection. So the Hoffman brothers came to me. Well, I read the thing. I didn't have any particular position about taconite, and I wasn't an expert in that area. But somehow it seemed to me that the article ought to see the light of day, and I published it.

To me, the interesting part of that story was that it wasn't many years before the entire iron ore market was graduated against the price of taconite. In other words, taconite ruled the market, and everything else was sold according to how well it competed against taconite concentrates. Here was such a group as the metallurgists--the chief advantages of taconite were metallurgical--and yet the metallurgists of that day rejected it. I thought that was an interesting story because the Hoffman brothers were right, and the experts of the iron ore industry were wrong. But that was a case where I thought that something ought to be published. I thought it had enough merit but without, you know, really passing judgment on it. There weren't many cases of that type, and there certainly never were any cases where we were pressured by advertisers or by the management of the McGraw-Hill company.

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McGraw-Hill

Just: I had a tremendous educational opportunity when I was with McGraw-Hill because during the war, Jay McGraw, who was the president of the company at that time, set up a scheme whereby he would take us chief editors to different leading cities of the country. We would listen to the local industrial people tell us their story.

One event that made a deep impression on me was a visit to Lincoln Electric in Ohio. This company made electrical welding machines and dominated the market. The management ran the company as if their most important objective was the well-being of the employees. They operated on an incentive system and the productivity and wages were far, far higher than general levels. The employees were so satisfied that unions didn't come near the plant. What impressed me was that with this marvelous practical example right in the midst of our industrial heartland, no other employers ever learned from it. Our people had to learn from the Japanese years later, forced by competition.

During these years there was also a prominent labor relations consultant named Whiting Williams who had gone to work as a blue-collar workman in several places in order to learn what made the workman tick. He preached that American industry ignored a valuable resource, the innate desire of a worker to take pride in his job and its product. He also was ignored. Again, we had to learn from the Japanese, compelled by competition.

Also, about every second month we would go to Washington and listen to leading politicians or agencies. McGraw-Hill had very effective access to leading business people and in Washington, and it was amazing the extent to which local industrial leaders in cities like Chicago or Dayton or Cleveland or Philadelphia or St. Louis would tell us of their private problems and successes. In Washington we had visits twice with President Roosevelt; a couple of times with Harry Truman when he was vice president or when he was senator; with Henry Wallace, the agricultural secretary. You might say that the Washington bureau of McGraw-Hill could open the doors of almost any department or agency to us. So we got a great education in those visits, not only in Washington but around the country.

Swent: What are some of their other publications?

Just: The most prominent one was Business Week in those days. I'm talking now about the magazine side. The book publishing company was a sister company. Business Week became the biggest thing at McGraw-Hill, but then we had Factory, for example, which was a strong publication. We had Power, Electrical World; I've mentioned Coal Age.

Swent: Were there any agriculture publications?

Just: No. We had Electrical West which was published here in San Francisco. That's all I think of right now. There were close to a dozen of them, and as far as I could tell you, they were all leaders of their field.

The McGraw-Hill company had strong leadership from the beginning. They had far-sighted top management. The founder was gone. He was still alive when I was editor, but he was retired. But his sons tried very hard to carry on the tradition, and they did. As far as I know, to the present day, McGraw-Hill remains a very prestigious publishing organization. Of course, it's greatly expanded. They've taken in other things. In the oil field, they've got three or four oil field services, for example, and they own a couple of other magazines which were quite influential in my time. The Engineering News Record was, you might say, the bible of the construction industry. They had another one which was primarily a picture publication, called Construction Methods. Both are very high grade and leading publications in the civil engineering field.

Swent: In earlier days, the main mining publications were in England, weren't they?

Just: Yes, and there's still a prestigious publication over there called Mining Journal. I get solicitations from it every now and then. It has a world-wide readership. We had a world-wide readership, too, but so has Mining Engineering, but not in the proportion that the Mining Journal is a world-wide publication. Mining doesn't amount to much in the U.K. anymore, except coal mining. So the Mining Journal has had to reach out to the international field.

Swent: As I went through these E and MJs in the years that you were editor, your editorial policy was quite distinct. There was your interest in tariffs, and you were warning about Communism in the labor unions. You had quite a strong editorial viewpoint. Those were two strains that I could detect very strongly. And the necessity for a national mineral policy, of course. You don't sign your editorials always, so I couldn't tell which ones you had written. But you were always very strongly pushing the industry to pay more to their young men.

Just: Yes, that was a campaign I conducted after I'd been to Washington, and in the years after 1948 until '51, I thought that the mining industry was not serving itself adequately. It just wasn't giving enough dignity and pay to the technical people, and I wrote a series of articles about that. I also wrote articles demonstrating that mining is a low-profile industry.

Swent: What about the magazine's function in analyzing the industry? For example, every year you ran a statement of mineral resources and prices and markets and so on. This was a very important function, also.

Just: Yes, it was, and we had a special editor for that.

## Publication of Metal Prices; Metal and Mineral Markets

We also had a tributary publication which was called Metal and Mineral Markets which we published weekly. This was an interesting aspect of the operation. This had been started by W. R. Ingalls, who was one of the earlier editors, around 1915, of E and MJ. It was published as a service to the mining industry to give them a basis for pricing in their trades.

You see, a great deal of the metal that was sold in those years and ever since, as far as I can tell you, certainly up to my time, is sold on a forward basis. You might sell for delivery, say, next September, and the price would be what E and MJ said it was. So there had to be a great amount of trust of E and MJ's integrity in declaring these prices. Well, these prices were put together simply by going around and getting the actual trades from different sellers and averaging them.

Swent: Did you ever run into difficulty getting this information?

Just: No. Of course, there weren't a great many people who made the market in terms of sales. American Smelting [ASARCO], Kennecott, Anaconda, St. Joseph Lead--they were the major ones. We'd go around every week, and we'd get their sales. We'd average them. The particular information was confidential, but the averages were published. They were and, as far as I can tell you, still are the basis on which most copper, lead, and zinc is sold today.

Swent: Does this happen in any other industry?

Just: Not that I know of. As far as I know, it was unique, and it was the invention of this W. R. Ingalls.

Swent: I can't imagine that you'd sell garments, for example, or cars, on the basis of a price that some magazine tells.

Just: No, well, there's other prices. If you look in E and MJ, you'll find a long list of prices, but those are just obtained by calling the principal sellers or buyers. They weren't done on the same basis. They were simply the best we could find out from the people who were in the market, but they weren't run on quite the same basis. They were, of course, naturally, as honest as we could make them, and they were a mixture of buyers' and sellers' prices. These others were producer prices, except that they were averaged out. Also, in these other minerals, you didn't have this scheme of forward selling where you depended on E and MJ to give you a price. Typically, the others would be sold under direct contract for a specified price, and the price which we published was really, you might call it, a milepost price, something to look at when you made a contract in that particular mineral.

Swent: So this E and MJ price was mostly in copper, lead, and zinc?

Just: That's what it covered, yes. We quoted a silver price, as I recall it, too, but again, that was not based on that averaging system. The averaging system was copper, lead, and zinc, and all of the others were really what you would call nominal prices based upon the best quotations we could get. But those industries didn't depend on us so importantly. You take, for example, in silver, Handy and Harmon always gave a quotation on silver. That's the most prestigious price in the silver industry. So as I recall it, what we quoted was simply what Handy and Harmon said the price was.

Swent: Wasn't there an Engelhard price, also?

Just: I think they were taken over by Engelhard, yes. By contrast, my own belief is that Handy and Harmon was always, you might say, on the buyers' side. Ours was in effect the producer price. We weren't on anybody's side, but we got the prices from producers. We did not consult buyers, whereas Handy and Harmon are processors. Their principal orientation is to the industrial consumer. While I would certainly never accuse them of shading their prices, they had a different orientation, whatever that means.

Interestingly, this pricing system came under the scrutiny of the Justice Department many times, and it was never interfered with. Even though the fact that throughout most of my life the anti-trust section of the Justice Department has always been run by fanatics, and they were out to hang anybody they possibly could to make an example of anybody who interfered with free prices. So they looked into us several times and never interfered.

Swent: It's really an amazing example of trust, isn't it?

Just: Yes, it is. But, oh, you take the man who ran that tributary publication, Hans Wanders. Why he would have been drawn and quartered before you could get him to corrupt that price. He was so dedicated to it, to its integrity.

As an example of what I say, some years after I was--seems to me this was in the 1950s--American Smelting and St. Joe were both accused by the Justice Department of unlawful fixing of the lead price. To this day I'm absolutely certain that that never happened. I have no evidence; I just feel absolutely certain that that wasn't true. But the Justice Department had to hang somebody every now and then to be a warning to the potential sinners outside the fence. So they brought this lawsuit against these two companies which both settled out of court, which I thought was too bad because to this moment, I'm absolutely sure they were not guilty. They were simply selected as victims of this fanatical attitude of the Justice Department in that anti-trust branch.

Now, that policy has been moderated, as far as I could tell you, in the Reagan years. The Reagan administration, as far as I can see, has been much more tolerant of approaches to monopolism than has been traditionally the case in the Justice Department. So as I said, we were always under very close scrutiny, but they never found any fault with the scheme. It was an honest scheme. There was nothing about it that needed to be concealed. It was simply a service to the industry and a good one, but it's unique.

Now, that which we published as a separate sheet in my time has since been severed, and it's separate--I think it's still alive--as its own publication, Metals Week.

Swent: Is it still McGraw-Hill?

Just: Yes, but E and MJ is not.

Swent: Of course, another important function of your magazine was the technical education for people out in the field who read your articles.

Just: Basically, that was its chief function in the final analysis, was to keep people in the industry technically up to date. Our editorial positions were always really secondary to that. Many years ago E and MJ was a weekly publication, so it contributed a lot of volume to the technical field.

## VII DIRECTOR OF THE STRATEGIC MATERIALS DIVISION, ECONOMIC COOPERATION ADMINISTRATION, 1947-1949

Just: In 1948, the people who were running the Marshall Plan--Paul Hoffman was the leader--asked me to come down to Washington and head up what they called the strategic materials division.

Swent: Let's see, now, the official name was the Economic--?

Just: Economic Cooperation Administration.

Swent: But it was known as the Marshall Plan informally?

Just: Yes. I think that's the way it's remembered. Most people today, if you talk about ECA, they don't know what you're talking about. But if you mention the Marshall Plan, they have some recollection of it.

This was the brainchild of General George Marshall, who was the chief of staff in the war and a man greatly admired by President Truman. As a matter of fact, I always had the idea that Truman thought that Marshall really should have been president. He had such a high respect for him, and he made him secretary of state. Of course, I don't know what assistance Marshall had, but it came out under his name.

The idea was to help Europe recover from war by what was really a big giveaway project. They had an initial appropriation of $18 billion which today people can sweep under the rug without ever thinking about it. But in those days, it was big money. So they had this program of helping Europe, and they had missions in all of the participating countries in Europe, which were attached to the embassies. Their basic purpose was to give aid to those countries, which they did. I believe that the Marshall Plan probably saved Europe from Communism in its day.

My job was kind of a cross-current in the organization. This was the Truman administration, and Truman had a Republican Congress, at least in that particular term. The Republican Congress was worried about all this giving away stuff, so they put in some provisions in the law which set up certain funds to be used by the United States for the benefit mainly of the U.S. stockpile. I would say the principal use of these so-called counterpart funds--or rather they were the 5 percent of counterpart funds--.

Now, I think I have to explain how the system worked. ECA did not give money to private people in Europe. The money or goods were given to governments, and the governments would parcel out the aid to different people in their particular country who paid for it in local currency. So these governments had these accumulations of what were called the counterpart funds, which in France would be francs. They'd be the equivalent of what we gave in goods or dollars which those governments, in effect, sold to their people. The people paid in their own currencies. So here was, in effect, something like $18 billion of counterpart funds. Well, the Congress earmarked 5 percent of those for the use of the United States. My job was to use those counterpart funds as much as we could to help the accumulation of the U.S. strategic stockpile. So, for example, we bought large quantities of rubber and sisal and mica.

Swent: Were you buying these in Europe? Rubber?

Just: Yes. They were supplies which the warring nations had accumulated and were left over as a surplus when the war ended. So we bought from those governments, principally the U.K. and Belgium and Holland.

Swent: They had imported these things, in turn, from their colonies?

Just: Yes, and they had surpluses which we bought. As I recall it, we bought $20 million worth of rubber on one occasion, and I think that was our biggest purchase. We bought a large accumulation of industrial diamonds, and as I've said, mica from the British. We bought sisal from two or three sources. Anything we could find that the stockpile people wanted, we would try to buy it for them.

There was another string to our bow. We could also take some of the dollar funds of ECA and spend them to develop new mineral enterprises in those countries or their dependencies, with the provision that they would repay in materials to the stockpile. We wouldn't get any money back. We'd get stockpile materials.

## Bauxite in Jamaica

Swent: Where did you do this, then?

Just: I'd say our best achievement was in setting up the aluminum industry in Jamaica, the bauxite production in Jamaica. That proved to be a very complicated business because different people in the industry had different attitudes toward its practicability, I mean the use of Jamaica bauxites in American plants. Reynolds was very anxious to have it, and they said that they had mastered the technology. Alcoa said there's no problem, and Kaiser said, "It's possible, but we want to do more research." So we had a conflicting attitude in the industry, with Reynolds being the ones who desperately needed this help.

Another complication--this was internal--was that Reynolds was already up to their necks in debt to the government. We had a wartime and postwar agency called the Reconstruction Finance Corporation [RFC], and they had lent so much money to Reynolds that my boss at ECA, Aubrey Harwood, who was a financial man from Los Angeles--he was with the Pacific Mutual Life Insurance Company--at any rate, as a financial man, he just wasn't willing to put his signature on lending more money to a company that was up to its neck in debt already. It was a matter of financial principle to him. I had to go over his head to Paul Hoffman in order to get this project sanctioned within ECA. When we met before Paul Hoffman, he listened to our stories, and then he said to me, "Well, Evan, what you're telling me is really a national security story. Your interest in this is basically for national security." And he says, "ECA is not in the national security business. ECA is in the aid to Europe business. Now, you qualify technically under this because this is an operation in a dependency of the U.K. I will go along with you, but you have to get the okay of the defense people in Washington."

You would be amazed at how difficult this was. We had the Army-Navy Munitions Board, of which I was a member in my time--

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Swent: Paul Hoffman sent you to the defense people.

Just: To the Munitions Board, and also there was another defense agency called the NSRB [National Security Resources Board]. The Munitions Board was a very funny group. Here we wanted to spend our own money to help them, but they were so bureaucratically mixed up that we never could get anything out of them that was either a condemnation or a help. Incidentally, the chief aluminum metallurgist in the U.S. Bureau of Mines said that it was a feasible thing to do technically, and RFC subordinated their debt to ours, but still we couldn't get anything out of that Munitions Board.

But this other agency--NSRB--I went to the head, which at that time was a man named John Steelman who was a confidant of the president. His field was largely labor mediation, but he was put in charge of this agency when the original head, who was the president of the Greyhound Company, went back, left Washington. John Steelman had come from Arkansas, so he told me that, "Oh, yes, I understand all this. Yes, I'll give you a letter of recommendation." Well, I'm satisfied to this day that John Steelman didn't know beans about this technology, but what he did know was that the Reynolds Company was a favorite in the White House. The Reynolds Company made important contributions to the Democratic party and had received large favors from the government which really put them on their feet as a big company. Both Reynolds and Kaiser were encouraged to develop aluminum capacity as part of the Justice Department's strong desire to reduce Alcoa's dominance. I'm satisfied in my own mind, although it was never mentioned, that it was really John Steelman's political acumen that got us our recommendation rather than any understanding of the merits of our case. Well, should we stop there?

[Interview 3: March 9, 1989]##

Swent: When we stopped last time, you were just mentioning the bauxite project in Jamaica. Is there more that you'd like to say about that?

Just: I might add that the man who was an aluminum metallurgist for the Bureau of Mines endorsed our position. Also, the RFC was willing to subordinate its loans to our added loan because they felt that in spite of the fact that Reynolds was so heavily in debt, it strengthened the company to have this additional source of bauxite.

Swent: In retrospect does this seem to have been a good decision?

Just: In some of this discourse it seems to indicate that we were trying to help out the Reynolds Metals Company, but actually our interest in the matter was to improve national security in bauxite, and we did. I'm rather proud of what we accomplished there because it did give the United States a source of bauxite which proved to be practicable, much closer to our shores than the Guyanas. Actually, the entire aluminum industry was benefited.

Swent: In what way did it benefit anybody but Reynolds?

Just: It proved through practical demonstrations that we were right about the feasibility of using Jamaica bauxite in U.S. plants, and it simply paved the way for the opening of the Jamaica bauxite industry.

Swent: Did other companies go in there then as well?

Just: All three companies had holdings in Jamaica.

Swent: That's Alcoa, Kaiser, and--?

Just: And Reynolds, yes.

Swent: So after you helped Reynolds get started, did the other companies follow?

Just: I'm a little uncertain to what Kaiser ever did. Alcoa developed at least some of their deposits.

Swent: Were these chemically different?

Just: Yes, they were monohydrate bauxite which has to be digested at higher temperatures than the trihydrate which occurs in Arkansas and the Guyanas.

## Lead-Zinc in Algeria

Another project which was quite successful was our loan to Newmont and St. Joseph Lead Company to develop an extension of the Zellidja ore body in Morocco. This was a prospective extension into Algeria which proved to be a very good bet because the mine was developed, it was successful, and the stockpile was paid off in lead or zinc as contemplated.

Swent: This was a lead and zinc mine?

Just: Yes.

Swent: In this connection, did you personally work on this project?

Just: Yes.

Swent: Were you dealing with the American companies or with the Moroccan government or--?

Just: No, we advanced the money to the joint venture.

Swent: That was Newmont and St. Joe?

Just: Yes. I might say that these companies didn't really need this money, but they wanted a certain umbrella which participation by the government would give them in such a location. It wasn't a great sum of money. As I recall, it was something like three hundred thousand dollars. The project was successful, and the stockpile was benefited. That, of course, was our principal division's obligation at ECA to help improve contributions to the stockpile.

There was one interesting aspect of this. We had a geologist headquartered in Paris who went down to look at it, and he condemned the project from a geological point of view. But back in Washington, I thought that the geology was good enough to override his opinion, which I did and proved to be right. The ore occurred in a graben, and this was simply an extension of the graben into Algeria. It looked to me at the time, and proved to be, a good geological venture.

Swent: Who were the people that you were talking with about this?

Just: Newmont and St. Joe.

Swent: Who were the individuals that you talked to?

Just: Well, Fred Searls mainly, who was heading up Newmont at the time.

Swent: Were you both still in Washington?

Just: As I recall it, we got that one done before I left. The Jamaica business actually was not finished until after I had left, but we had done the necessary spade work.

Swent: Was Fred Searls still in Washington?

Just: I don't think he was. Seems to me his associate, Henry Dewitt Smith, had been down there. I can't recall that Searls was ever there.

Swent: In the course of the dealings, you were dealing with Fred Searls who was in New York, and then you also went to Paris?

Just: Oh, yes.

Swent: You said you met there with Mrs. Biddle?

Just: Yes. That didn't have any particular effect on my judgment. She was very anxious to be helpful, and she introduced me to the French principals. But our decision to go ahead was not influenced by her desire.

Swent: But it must be sort of interesting to have lunch with Mrs. Biddle just the same?

Just: Well, it was. She had a penthouse overlooking the Place Vendome and a beautiful, little automobile-- a Bentley--with solid silver mountings. She was certainly very hospitable to my wife, who was with me on that particular trip.

Swent: She was the daughter of Colonel Thompson, who founded Newmont.

Just: Yes, William Boyce Thompson's daughter.

Swent: Did you get to North Africa at all?

Just: Not for ECA, no. To pass judgment on it, what you needed was the geological facts, and they were on paper, so to speak.

Swent: Did you have your own geologists go and check on these things, and then the companies also submitted their geology reports?

Just: Yes. Actually, there was an odd situation there. It was the French geologist of the Zellidja Company who projected this idea that the ore would follow the graben in which it occurred in Morocco. That was a very logical conclusion, but the Newmont-St. Joe geologist who took a look at it wouldn't buy the idea. What he wanted to do--if this was the ore body, and here was the eastward projected extension--he wanted to drill a ring of holes because there was certain limited geochemical information that indicated that the ore fluids might have come from the south. In the ring of holes they drilled, they simply confirmed the French geologist's opinion.

## Politics and the ECA

We had two men sitting in Paris. For your information, ECA was headquartered in Washington, and we had missions attached to these different European embassies, American embassies. But they had a political situation which was a little bit embarrassing because ECA was dominated by Republicans in a Democratic administration. Paul Hoffman was a Republican; Howard Bruce was a Republican. The Democrats in Congress were disgruntled over this, so they created a position of coordinator to sit in Paris and coordinate the missions in Europe. This job was given to Averell Harriman. It was very frustrating to him because the missions all preferred to deal with Washington; in other words, go to the source of power, rather than fool around with a coordinator sitting in Paris. So Harriman was in an awkward and frustrating position.

But we had two men representing our division sitting there with him. One was a chap named Hughes who had been with the Bureau of Mines. I forget how he was employed when he came on with us. The other was this geologist, Mark Bundy. He was the one who didn't want to go ahead on Zellidja.

There was, to me, another interesting circumstance, though. You see, ECA was essentially a giveaway organization, and we were a back current in it because we were supposed to get something out of all of this spending for the U.S. stockpile. But it was amazing how the people in ECA took on the color of their environment. In our case, our representative, Hughes, became so oriented against us that he actually made a separate trip to Washington to protest against our policies. Our policies were nothing in the world but carrying out our duty under the statute. Well, he didn't get anywhere, but it indicates the extent to which people became sympathetic to the attitudes of their local environment. Most of the ECA people in Europe became very friendly to the viewpoints of whatever country in which they were stationed. This is why the State Department moves its foreign personnel periodically.

Swent: Those are very interesting things; those are the kinds of things that don't appear in the records.

Just: Take, for example, now, Harriman's frustration. I had made a trip to Europe, and I had gone to three or four of the missions where we had interests. I had touched base in Paris before I left, and I got back to London and was going to back to the States.

Harriman calls me, and he was offended because I hadn't touched base back there with him before going to Washington. You see, that was his frustrated state of mind, and he actually insisted that I must come over there. He managed to have the Air Force send an airplane for me, and I went over there and had a very pleasant lunch with him; nothing else. Then I went to Washington.

Swent: Just to satisfy him that he was in the circuit?

Just: That he wasn't being short-circuited. Well, I had no such intention. I didn't care one way or another about--I certainly had no viewpoint against Harriman. I was aware that he and his people there were frustrated, but it wasn't my doing.

Swent: Which other missions were you visiting and why? What other things were going on there?

Just: We had the British mission and Holland and Belgium.

Swent: Did you get up into Scandinavia at all? Did you do anything in Scandinavia?

Just: No.

Swent: Was there anything else in Africa other than Zellidja?

## Industrial Diamonds in French Equatorial Africa

Just: We made an effort to help the production of diamonds in West Africa, French Equatorial Africa. But whatever was finally accomplished was accomplished after I left. Actually, the firm of A. E. Jolis and Company of New York was able to develop a relationship outside the cartel for diamonds in West Africa, so they did provide an alternative to the cartel. One of the Jolis family was in the Paris mission, or rather the Harriman organization in Paris. I think that the relationships he established that gave them a separate source were largely accomplished by his own personal intervention rather than anything that our department did. I don't remember that we had really accomplished anything there.

Swent: That was Harriman's personal intervention or Jolis's?

Just: I think Jolis was able to negotiate some connection with these producers in West Africa. But this was a kind of an odd thing because the Jolis people were interested in gem diamonds, and we were not. We were interested in industrial diamonds, and we were nervous about the cartel--that is, the U.S. Government was nervous.

Swent: When you say the cartel, is that De Beers?

Just: De Beers, yes. There was a large producer in the Congo. They were the largest producers of industrial diamonds, but they were affiliated with the cartel. We couldn't persuade them to do otherwise. I will say retrospectively, as far as I know, the cartel never did anything to hinder an appropriate flow of industrial diamonds into the markets. The prices were always reasonable, and I don't think they were interested particularly in what they could do in terms of pricing industrial diamonds. Their main interest was in gem diamonds. To this day, they dominate the gem diamond prices.

But I must admit that in my own humble opinion, I don't think it's been a damaging thing, actually. Actually, by holding up the marketing of diamonds and maintaining a certain price, they maintain the value of the diamonds which people own, so that if diamonds had been selling for a dollar a carat instead of fifty dollars or more a carat, then nobody would care for them anymore. Gem diamonds are a luxury anyway. So I'm not critical of the cartel in the diamond area.

Swent: There was an article in the E & MJ in July, 1950; I wonder if you wrote this article. It didn't have a byline. "Production Proration Can Serve Industry and the Public," an article about non-governmental production allocation compacts. Perhaps you wrote this partly as a result of your awareness of the diamond cartel?

Just: I did believe, and still believe, that cartels could operate in the public interest if they had wise leadership.

Swent: You gave the example of the International Tin Committee.

Just: Yes. In my position in ECA, I was a member of the U.S. delegation to the Tin Committee. We didn't have a vote, but we were invited in as observers because the United States was the principal market. But I think this Tin Committee was a case of a cartel run very well, and I think by and large the public interest was benefited by it.

Swent: Does it still exist?

Just: I'm not sure to what extent it's still running. I really have to pass that up. I haven't kept up with what is going on right now, but at least up to my last memory of it, I thought that the tin cartel was a good thing for the public interests as well as for the producers of tin.

Swent: Were there any other committees similar to the Tin Committee that you served on at that time?

Just: No.

Swent: How were the policies established for the stockpiling? Did you have a quantity goal?

Just: No, the stockpile was short of virtually all minerals, and anything we could have done would have been a relatively minor contribution to the total deficit. So we didn't set up particular goals. We just did what we could to be helpful, and we did help. We bought a lot of diamonds, as I had mentioned earlier, and we bought other stockpile materials: a lot of rubber, some sisal and mica, as well as these things like the Jamaica bauxite and the Zellidja lead-zinc. Overall stockpile goals were set by the Munitions Board.

Swent: How long were you in Washington with the ECA?

Just: A year and a half.

Swent: You were on leave then from the E & MJ?

Just: Yes.

Swent: Did you continue to write for them at all?

Just: During my time in Washington, no.

Swent: You had no contact?

Just: No. Well, I gave a couple of speeches at the mining meetings, and I think, as I recall it, one of them was published in the Mining Congress Journal. I can't remember if E & MJ published any of that or not, but it wasn't done for E & MJ. It was simply talks I made to the mining people about what was going on in ECA.

Swent: Did you do anything domestically? Was it all foreign?

Just: Yes.

Swent: I had a note here from September, 1951, that ECA funds were helping finance the search for ore, but I'm not sure--I think it was tungsten and quicksilver in French Equatorial Africa, the Niari Basin in the Middle Congo.

Just: Would you repeat that please?

Swent: Well, this is just a note that I had. Tungsten, quicksilver, and copper mines were being developed in California, and ECA funds were helping to finance the search for ore in French Equatorial Africa in the Niari Basin in the Middle Congo. Maybe that was copper; I'm not sure.

Just: I don't remember. That was probably a news article that E & MJ had published about ECA activities after I left. It sounds like a complaint that the government was fostering competition to domestic producers. Didn't have my byline on it, did it?

Swent: No, I was just looking for things that might have come from your activities.

Just: Well, at the end of '49, McGraw-Hill said to me, "You'd better plan on either staying in Washington or coming home because it's not fair to these fellows who are running the paper to have to do it with you absent and their possible promotion in doubt." So--

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Just: I decided by that time that I certainly did not want a Washington career, because Washington is such a frustrating place to try to get anything done. It seems as though everybody in Washington is ganging up on you to prevent it. I had enough of it in a year and a half. It was an interesting, exciting experience, but I had no desire to stay in that kind of an atmosphere. So I went back to E & MJ.

Swent: Did you actually move and live in Washington? Take your family down and live there?

Just: Yes. We lived in a house of a friend of mine who was with the Geological Survey and was somewhere down in the Southwest on assignment, so his house was available.

Swent: What was his name?

Just: Hendricks. Offhand I can't think of his first name.

Swent: That's all right. It was the Korean situation that put the heat on all of this, wasn't it?

Just: The Korean War was not going on while I was in ECA. I left things in the hands of a very capable successor, Harry Burgess. He later became chief geologist for the Kennecott Company. He did a very good job of carrying on. He and these other people, we had some good men in that office, including Charles Stott who later became manager of the Tsumeb mine in Namibia.

Swent: Was Tsumeb one of the mines that ECA helped to start?

Just: No.

Swent: What about O'okiep?

Just: No, that had no government help that I know of. There was a government participation in it on the part of the South African government. They had, I think, a 35 percent interest in it, but the U.S. government had nothing to do with the financing of those organizations.

After my departure, one of the things they tried to do--that is, our division of ECA--was to stimulate manganese development. There was an undeveloped manganese deposit in the Belgian Congo, and we made an effort to get that developed. But actually, this aroused the interest of the head of Union Miniere who ran the copper operations in southern Congo. At that time, that company was headed up by a very dynamic leader. I don't think of his name now, but he became interested. He actually moved in on this manganese thing and took it over. He got so frustrated with all of the red tape in Washington that they went ahead and developed it on their own. So it got done, but ECA couldn't claim any credit for it except maybe triggering it.

Swent: So the Washington life was not for you?

Just: Too utterly frustrating. You take on this Jamaica thing, what we had to do to overcome indecision by the people who needed the help! I think the worst one was the Army and Navy Munitions Board. They just couldn't make up their minds on anything even though we were quite happy to do it with our money, not theirs. They just couldn't make up their minds about anything. When you had to deal with people like that all the time, it just becomes too much, too much. So I wasn't designed for the Washington type of life.

Swent: Did you make contacts there through that experience that were helpful to you later?

Just: No, not in particular. I can't recall any. I certainly had nothing to do with any of the ventures that we had been involved with during my ECA days.

Swent: Cyprus was not in the picture at all, then?

Just: No.

Swent: Was ECA helping Greece at all at that time?

Just: Well, actually, I'm trying to recall whether Cyprus was Greek or Turkish or independent at that time. I think it was Greek jurisdiction. As I recall it, we didn't have a Greek mission. There was a separate organization where the armed forces were involved that was looking after Greek business. So I don't recall that we had a Greek mission. The Cyprus company was going along in a normal way. There was no need for any help from us. It was a very good property, and it was a rich company, so they didn't need our help.

## Return to E & MJ

Swent: So you went back, then, to the E & MJ?

Just: Yes, and I stayed there until 1952.

Swent: Let's just make sure, have you said all you wanted to say about the E & MJ responsibilities? You had an opportunity there to really speak out for a lot of things that you felt strongly about.

Just: I did, and I did so. I would say it was a fine experience. It was an influential position and an interesting job, and I did my best to be what I would call an informed protagonist of the mining industry. But in a good many instances you had to remind your friends that maybe some of the policies they pursued out of, you might say, their natural tendencies were not the best policies in the long run. So on a good many issues, you had to try to persuade people against their immediate positions for what you deemed to be their own well-being.

Swent: Can you give an example?

Just: For example, in the matter of protectionism, tariff protection and all that, we projected a moderate point of view. I would say that was our general policy. We tried to be the industry's friend without being a blind friend, if you get my point. To the extent that a publication can accomplish that, I think we did in those years.

Swent: You wrote a good many articles about the tariff situation. What was your feeling about that? Did you have any effect?

Just: It's hard to say what effect you have on an industry's thinking. I think I can truthfully say, we preached a moderate position.

Swent: You advocated tariffs for certain parts of the industry, didn't you?

Just: Yes, and of course, I had been involved in a big tariff fight when I was down in Oklahoma for the Tri-State people. But that was a case where the State Department had violated their own precepts, and we were simply trying to get them to recognize what they told the public was the way they operated. They had violated those precepts in the case of the zinc tariff, and we struggled to get that position corrected. We struggled with no success because there was a zealous attitude in the State Department about tariffs at that time.

Swent: What was their attitude, to do away with them?

Just: Well, they were strongly free trade. Cordell Hull [secretary of state, 1933-1944] was strongly free trade. I would say that the basic argument for tariff protection, at least in minerals, is where national security is involved. In those years at least, the concept was current that you needed a strong industrial base in the United States for its own security. So where national security and national self-sufficiency for an emergency was involved, I thought and still think that tariff protection, as long as it was not burdensome to the consumer, was warranted.

Actually, looking at it in retrospect, I think that was a valid position but the present condition of nuclear warfare and a large stockpile tend to negate that position. Nuclear war would probably be decided before you would have to fall back on your latent industrial resources to maintain a belligerent position. So I would say that thinking is largely obsolete now, but I thought it was valid then. I still think in the terms in which we viewed warfare at that time, it was valid.

Of course, the stockpile also was an ameliorating influence because if we actually had enough stockpile minerals to carry us through a war, you wouldn't have had to have a going industry to do the same thing. All depending, of course, on how long the war would last. But the conditions have changed enormously since that time, and so I think that the argument for tariff for national security is not as valid as it used to be.

During those later years with E & MJ, one of the things I tried to do was to arouse the industry to doing better by its engineers. I think we accomplished something in that respect. Although in those circumstances you never know how much you did and how much the natural course of events did.

Swent: You wrote quite frequently about the need to pay them more and give them advancement.

Just: You see, the mining industry was rather like I had found it in the oil industry. As I mentioned to you, the engineers were viewed with contempt by the practical man in the industry, and that was more or less true in mining up to a certain point. There was some hangover of that attitude even in those years. I'm a little bit at a loss to suggest just what the attitude is today, because it seems to me that so many engineers today are preoccupied with theoretical solutions, with mathematical models and that type of thing. I'm a little bit at a loss to know how much good they're doing the industry or qualifying for line positions.

By 1951, I had decided I wanted to leave E & MJ for two reasons. First of all, I wanted to get back into doing something in the industry directly rather than writing about it. Secondly, I believed, and still do believe, that any inspirational leadership you can give to an industry, you can shoot your wad in ten years, and you really ought to step aside and give somebody else a chance. So it was based on those two feelings that I decided to quit E & MJ and started to look around for something to do in the exploration field. Then was when I made this connection with the Cyprus Mines Corporation.

## VIII VICE PRESIDENT, CYPRUS MINES CORPORATION, 1952-1958

Swent: How did that come about?

Just: Well, actually, I asked Fred Searls for advice on it because I greatly respected his judgment, and I knew that he, like myself, knew almost everybody in the industry. He was the one who suggested I talk to the Cyprus people, and I did.

Swent: Whom did you talk to at Cyprus?

Just: Harvey Mudd, the president. Their head office was in Los Angeles.

Swent: You came out here to talk to him?

Just: Yes.

Swent: Had you met him before?

Just: Oh, yes. I knew him fairly well.

Swent: How had you met him?

Just: I can't specifically remember. You see, as editor at E & MJ I got around a lot.

Swent: You met everybody?

Just: You might say that almost. I can't recall specifically how and where I became acquainted with Harvey Mudd.

Swent: Was he about at retirement age at that time?

Just: He was near it, and his statement to me was, he said, "For myself, I'm not particularly interested in new adventures." But he said, "It's up to Henry [Mudd, his son]. If Henry wants to expand our exploration efforts, I'll go along with him." It turned out that Henry did, and so we set up this addition to their already existing exploration effort.

Swent: This is what you wanted to do?

Just: Well, I wanted to get back into exploration.

Swent: Did you go to him with a proposition?

Just: I simply expressed the general idea that the best way to find mines was to let somebody else find them, and then you move in and back him up financially. In other words, a good many new mining ventures, the initial discovery is made by a prospector or some little group that has insufficient funds to bring a property into production. That is the best way for a mining company to operate, simply because the overall odds against success in direct prospecting are so poor. There was nothing terribly unique about that attitude, because it was actually the attitude which practically all companies were following. Cyprus was in a position to do that because it was a well-financed company. They had plenty of money to open up new mines. So it fitted in, and the argument appealed to Harvey Mudd. So off we went.

## Heading a New Exploration Division

Swent: So you were employed directly as vice president?

Just: Yes, they made me a vice president, and we opened a new office in New York. We didn't disturb the already existing activities of their exploration department in the western United States. We were simply undertaking to try to find mines elsewhere. So in those years, the following six years, we had, in effect, two exploration departments.

Swent: Did you build up your own staff then?

Just: Yes, to a limited extent. I hired an assistant whose name was Lendall Warriner who, as far as I know, is still an associate of Behre Dolbear & Company in New York. We opened a Toronto office, and the head of it there was Cyril Stewart who was a well-known Toronto mining engineer. We set up what we termed "listening posts" in Flin Flon, Manitoba, and Vancouver, and off and on in Quebec.

Swent: Flin Flan was uranium, wasn't it?

Just: No, Blind River you're thinking of, I believe you are. The best known operation up there was a copper, lead, and zinc operation, Hudson Bay Mining and Smelting Company. It was copper, lead, zinc country.

Swent: Did you have any particular projects in mind that you wanted to investigate?

Just: No, we simply were looking for chances to find prospectors who needed help. This was an intensely competitive field, intensely competitive. So you just had to be on the qui vive all the time trying to cover as much territory as you could. We also had a listening post in Peru.

Swent: What did Cyprus already have at this point?

Just: Cyprus had the important copper mine in Cyprus. They had had a gold mine, the Cactus Queen, which at that time was idle, down in the Mojave Desert. So the only active mine they had was in Cyprus. Now, during my stay there they acquired two good mines, but my section of the company did not participate, except very marginally, in those acquisitions. One was the Pima Mine in Arizona, which was a good copper mine, and the other was the iron mine in Peru.

Swent: Marcona?

Just: Marcona iron mine, a partnership with Utah Construction Company.

Swent: You were not much involved with that?

Just: I was involved only to the extent that I was the first one from the company who interviewed Allen Christenson of the Utah Company on the project. I thought very favorably of it and so recommended it to the head office, but all the subsequent negotiations were carried on in California because both company headquarters were out here. There was no particular merit in recognizing this as a worthy project because it was obvious, and it proved to be a very profitable operation for both those companies. It was subsequently nationalized.

Swent: That was in 1953, I think, that they formed Marcona.

Just: I can't remember just when. It was the early fifties as I recall it.

Swent: Then Pima was formed with Union [Oil Company] in 1956.

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Did you do a great deal of traveling at this time?

Just: Oh, yes, a great deal. I was frequently up in Canada, in different parts of Canada: in Quebec, New Brunswick, Newfoundland, Ontario, Manitoba, Yukon, the Northwest Territories. We tried awfully hard to cover a lot of ground. As I said, the competition was severe, and you just had to practically break your neck to have any chance of doing what we sought to do. I also traveled to Peru and Turkey and Morocco looking for opportunities. Also Ireland.

It was hard work. As I said, we pushed ourselves very hard. At the same time we never really meshed well with the head office, so we really never established what I would call a truly competitive effort in the exploration game as far as my part was concerned. The head office at the time was extremely conservative.

To summarize the six years of activity, I would say we dug up three good chances out of all of that effort. The most important one was to obtain control of the Blind River uranium development. A man named Hirshhorn was the leader of the group which had an advanced prospecting effort up there and came up with some really important finds. I had visited these prospects in their early drilling stages, and they didn't look good enough for us to participate at the time. But I kept up a friendship with Joe Hirshhorn who, incidentally, is the man who founded the Hirshhorn Art Museum in Washington.

The time came when Hirshhorn had proven two important uranium deposits up there, and he came to New York looking for $15 million. But while this seemed like a large sum of money, it was, you might call it, a lead-pipe cinch from a profit point of view because the U.S. government was willing to underwrite any such effort with a contract that was designed to give the developers a profit on top of their money back, because of the eagerness of the U.S. government to acquire uranium at that time.

Swent: This was under the AEC [Atomic Energy Commission]?

Just: Yes. So it was virtually a riskless venture on properties which had already been proven by drilling. Well, I was tremendously excited about this because it was a chance to take over a really important development. But when I consulted Harvey Mudd, he turned an absolute thumbs down on it, simply because he didn't like Hirshhorn, and he didn't want to be associated with him. So that went out the window, and you could say it broke my heart.

Swent: When was this?

Just: As I recall, Harvey died in 1956, so this would be in the year before his death.

Swent: It must have been very disappointing to you.

Just: Oh, it was a tremendous disappointment because we had worked so hard, you know. Here was a real chance, a real chance. As I said, this judgment was not based on financial considerations or geological judgment. It was simply based on a personal dislike of the potential partner.

Swent: I thought Henry was running things at that time.

Just: No, Harvey was still alive, and Harvey's the one--he was in New York, and I put it up to him in New York because Hirshhorn had come down to see me. So this decision was made right in our office in New York by Harvey Mudd.

Swent: So when he gave the reins of the presidency to Henry he still hung on to a lot of the power?

Just: I'm not aware that he ever did that. Henry succeeded him as president, but the thing that was just under Henry's guidance, so to speak, was our particular part of the exploration effort. But Henry was not president of the company then. I don't think he became president until his father died.

Another opportunity to acquire a good mine was in Ireland. I went to Ireland and roamed around there for the best part of a month looking at prospects, and I decided that the old Silvermines area was worthy of further development or further efforts. So we made a tentative deal with the owners, but the lawyers back in Los Angeles killed me. They seemed to insist on a perfect title, and when you were dealing with a project that was a thousand years old, a perfect title is simply impossible. The people who had it already had a perfectly adequate working title, but it didn't suit the lawyers. I got no backup from anybody else, so that went over the dam. It later became a successful mine.

Swent: Where was it?

Just: At Silvermines. There's a town named Silvermines in Ireland. The Canadian people who had led me to it took over again, and they finally financed it. It became a successful mine. So there we lost another one which wasn't anything like the size of the uranium effort, but it was a good mine. It would have been worth having.

The third one--this was when we were close to the breaking up period, and I could sense that we were not going to last much longer because we weren't really getting anywhere. I was convinced that our effort wasn't going to last much longer, but up came a prospect in the Eastern Townships of Quebec. This was a geophysical anomaly close to the Weedon Copper Mine, northeast of Sherbrooke, in the Eastern Townships. I simply underwrote a deal to do some drilling on this thing out of a kind of desperation. I didn't consult anybody else. I simply used my vice presidential prerogative and signed the papers. Luckily, the first drill hole ran into ore.

Shortly after that, Henry Mudd informed me that they had decided to quit the effort. I concurred with them because I felt that we were spinning our wheels, and it was simply frustrating. But I remember telling Henry, I said, "I'm glad to say that whatever money we have spent on this exploration effort over six years you'll get back out of this mine." Well, I don't know what they got back. It turned out, it was developed into a 4,000-ton producer. As I recall it, the name of the company was the Hastings Mining Company which was the group which had vended it to us. But then Cyprus's relationship with them was so frustrating that Cyprus dealt the mine back to them or at least to some Canadian interest who developed it into a going mine.

Swent: This was copper?

Just: Copper-lead-zinc. They almost acted as though they didn't want a good mine when they had it. As far as I could tell you, although I was no longer involved.

Swent: Were you threatening somebody out in the western division?

Just: Oh, no. No, it wasn't that. I wouldn't call it a rival organization, but there was a separate exploration organization headed up by Blair Stewart. But there was never any animosity between us or any desire to take precedence over the others.

Swent: So that was not the problem?

Just: Oh, no, not at all. I really don't know what the problem was because here we had the obvious makings of a good mine, and the further drilling they did simply was proving up the ore body. Then they traded it off, but I don't have any notion of what they got for it. But I'm sure that it--I had the impression that they just didn't want it. [chuckles] This is kind of ironical because it wasn't many years after that, that instead of this deep conservatism, Cyprus became one of the most adventurous companies in the business and still is today.

Swent: What do you think caused the change?

Just: I don't really know except that Henry Mudd left the presidency, and new people came in. They simply developed a very adventurous spirit.

Swent: When you left did you sever your connection completely?

Just: Yes. We remained friendly; Henry and I have always been friends. That's personal friends. When Henry told me in 1958 that they were going to shut it down, that was that, and we shut it down. The experience was very disappointing because it was the first time in my life I ever felt that I had failed at something, and that was a hard thing to take, but somehow I have survived. [chuckles]

Swent: Did your wife have any say in these changes that you made? Did you discuss these things with her before you left E & MJ, for example?

Just: Well, I always consulted her, but she was always a good adventurer. She was always willing to tackle something new, and so there was never any discord about it.

## Honorary Doctorate, Montana School of Mines

I might mention a couple of things that occurred during those years that were apart from the Cyprus operations themselves. In 1954 I was granted an honorary doctorate of engineering degree by the Montana School of Mines.

Swent: Would you like to comment on the talk that you gave at that time?

Just: I gave a talk there entitled "Rock in the Box Is Not Enough" which was simply telling the graduating class that they had better take more active participation in political matters than my generation had done because if they didn't, they would be, in a nuclear age, very much in peril. Well, it was a nice idea, but I'm not aware that that younger generation ever behaved very differently from my own generation. The result is we are in peril from too little public attention to public affairs. But I guess that's a chronic ailment of democracy, so we have to live with it.

## Textbook on Mineral Economics

Another thing that is worth mentioning is that a group of us who were interested in mineral economics developed a textbook on mineral economics under AIME auspices. I was the chairman of the editorial committee, and we got E. H. Robie--who had been the secretary of the AIME and was then retired--to be the editor. We had a very good group of authors, and we turned out what I think was a very fine book.

Swent: I think I mentioned to you that your chapter in there has turned out to be my bible for mining terminology.

Just: That was the last book. In the earlier I wrote about the role of minerals in the economy.

Swent: So this book was commissioned by AIME then?

Just: Yes, and they obtained money from the Mudd fund. Then the book was dedicated to Harvey Mudd, who had died by the time it came out.

Swent: It came out in several editions, didn't it?

Just: It came out in three editions, the first one, and then a few years later, the authors were given a chance to revise their contributions. There were very small revisions. But then the thing was carried on by a new group of people who simply wrote a new book, and I participated in that to the extent of writing one chapter.

Swent: The first one was more practical?

Just: The first one I would call a good, practical textbook. The second one was so highly theoretical that I didn't have much enthusiasm for it.

Swent: You mentioned that a group of you got together. How did you get together? Were you going to clubs in New York, or how were you maintaining contacts with these other people? Were you meeting at the Mining Club in New York?

Just: Yes. In fact, I was a member of the board of directors. I forget what they call the governing board. I was the leader in developing an uptown branch of the Mining Club.

Swent: This would be mainly a place where you would meet for lunch and compare notes on things?

Just: Yes. It was a very nice place to go for lunch and mingle with the mining folk. They used to have evening meetings. I remember one meeting when they had Joe Hirshhorn as the guest, and he told about his encounters with American mining people in developing Blind River. It was absolutely uproarious how stingy and cheap he made them all look. But the Mining Club was a very nice club. I'm not sure if it's still running or not. During my time, we had the downtown branch, and then we developed that uptown branch.

I can't specifically recall how we got together on this mineral economics volume. I don't think we were invited by the SME leadership, but I just can't recall how it came up. I know that some of the people who were interested with whom I was in relatively active contact--there was Elmer Pehrson with the Bureau of Mines, he was on that committee; there was Bud Raymond, he was with Ford, Bacon and Davis, a consulting company in New York. Offhand I don't recall who else was on that committee. Unfortunately, I cannot remember just how this venture started. But it proved to be a very good book, and I think it was a very useful thing for the AIME to do.

## Teaching at Columbia University

I might say that in the early fifties, I was invited to teach a mineral economics course at Columbia University. This had been taught for some years there, and the professor who taught it had died. They asked me to come up and take over, which I did for--I can't recall whether it was one or two years. But it became a little bit awkward for me to do this teaching job and also take care of my E & MJ work. So I gave it over to Elmer Pehrson, and he taught that course for several years, commuting from Washington.

Swent: You have just answered one of my questions. I couldn't figure out where you had been a teacher of Henry Colen, but it must have been when you were teaching that course at Columbia.

Just: Yes, that's right. How did you meet him?

Swent: Oh, I've known Henry for many, many years. We were friends down in Mexico when he was just out of college, and he's been very helpful with our mining series. I ran into him the other day, and I said, "I'm interviewing Evan Just now. Do you know him?" He said, "Yes, he was one of my professors." Then afterwards I thought, "Wait a minute, Henry didn't go to Stanford or Lehigh."

Just: That's right. He was one of the good ones in that class.

Swent: He's been an outstanding geologist.

Just: I've lost track of him completely. Where is he now?

Swent: He lives up in San Rafael, and he has formed his own company that developed a prospect in Micronesia in Palau and has just been--I don't know, I don't think "taken over" is the correct word--merged with a larger company that has done exactly what you were just talking about. Henry did the prospecting and developed it, and this other company came in with stronger financing, a group from the East, that has the financing and was looking for a good prospect. He's done really well.

Just: I'm glad to hear that. I'm glad to hear of him. If you see him again, please give him kind regards.

Swent: I will. His son is in the business with him, and he's got a very exciting project down there. He started out with San Luis down in Mexico. That's where we were together. Later, he and my husband worked together for Homestake, and then he went off on his own.

So he was one of your students?

Just: Yes.

Swent: So that gave you a taste for the educational world?

Just: Well, I'd had prior experience there, too. I enjoyed that class. The students were satisfying, and the subject was interesting.

Swent: When you left Cyprus, you stayed on in New York for a while, didn't you?

Just: Yes, I spent until late '59, in other words approximately a year, doing consulting work.

Swent: You had an office in New York City?

Just: Yes, in Rockefeller Center.

## Writing on Mineral Economics

I'm just wondering whether I should mention another item that was to me rather important. In fact, I thought it would be my swan song in the mineral economics field. About 1952, as I recall, I was asked by the American Association for the Advancement of Science to write an article for Science magazine on minerals for the future. In that article I came to the conclusion that civilization was never going to be jeopardized by a lack of the non-fuel minerals.

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There is a very large potential in the improvement of exploration techniques. There is an enormous potential in the possibility of higher but affordable prices, and in conservation and reclamation.

Swent: How did the higher prices matter?

Just: Higher prices make marginal deposits profitable.

Swent: They don't actually create more minerals but they make them more economically feasible?

Just: It makes the marginal parts of deposits, which are usually larger in total metal content than the really good part, profitable, as well as totally marginal finds. There was also enormous potential in what had already become a great contribution of the metallurgists to mineral processing. I always felt that the contribution of mineral processors to the availability of minerals was not adequately appreciated by people in general, but their contribution in improving mineral treatment has simply been enormous over several decades.

Then the last, there was the potential for substitution. In terms of substitution, I had it worked out that there were something like fourteen elements--all that were necessary to support an ongoing industrial civilization--that occurred in such abundance that you couldn't get rid of them--iron, aluminum, silicon, magnesium, sodium, calcium, manganese, phosphorus, sulfur, chlorine, nitrogen, carbon, oxygen, and hydrogen. Therefore, given enough power at an adequate price, eventually the substitution of a lot of minerals by these ultra-common minerals would still carry civilization's needs.

Well, at that time, my judgment was defective simply because I thought that the long-range future of power would be taken care of by nuclear energy. Of course, in these intervening years, nuclear energy has become so controversial that I would hesitate to predict what its part is going to be in generating power for the future. But an industrial civilization has an enormous dependency on power, so power is the key factor. Of course, between different kinds of fossil fuels, we have enough for some hundreds of years, probably. At the same time, the future of the fossil fuels seems to be in jeopardy with all this anxiety about the greenhouse effect and acid rain.

So what the future course on availability of power is going to be, I don't know. If we don't have power to make these low-grade substitutions, that upsets the whole idea. But at the time, I thought I was making an important contribution to national thinking on the possibility that civilization might have to collapse because of mineral depletion.

Swent: What sort of reaction did your article get?

Just: Well, I don't really know. I kept pursuing the subject. While I was at Stanford, I wrote two or three other similar articles, but I don't really know. At least, as I said, the picture has been distorted by the factors I've just mentioned, so the outlook is more difficult. Although I would still say I don't believe that civilization is going to be in jeopardy for lack of non-fuel minerals because even though power may not be cheap, these abundant substitute materials are there and can be utilized whenever the others get too expensive.

Swent: Nuclear energy seems to be more popular now than it was a few years ago. There are still problems of disposal, of course, aren't there?

Just: Very difficult to tell because there's so much public resentment. You know, if we have another nuclear accident like the one at Three-Mile Island or at Chernobyl in the U.S.S.R.--you know, accidents like that are bound to occur sooner or later. If we get another one a few years from now, it's hard to tell what the public reaction may be. I must say that as far as I know, this matter of disposal of atomic waste still seems to me to be a very difficult problem.

Swent: That's the real sticking point, I think. It's kind of hard to remember now, but I remember when we were first involved in the uranium boom. Everybody was so excited because nuclear power was going to do what you say, make cheap, abundant power available so that civilization could just thrive.

Just: Of course, in those days we never had any doubt about the use of the fossil fuels until they were depleted.

Swent: We didn't foresee all these problems with disposal and certainly not the political problems of nuclear power.

Just: No, and we didn't have any notion about this greenhouse effect or acid rain. Of course, I must admit that I'm very much baffled over this greenhouse problem because we're really not doing anything about it except talking about it. We don't really know what the results may be if we continue to burn the fossil fuels as we are doing, and yet, how can we get away from it? Our type of civilization is so utterly dependent on power. What can we do? It's a very, very difficult thing to foresee what the result is going to be. What are they going to do if they find out that this greenhouse effect is a very genuine threat to human well-being? Are we going to go back to a horse-and-buggy age?

Swent: Even then people burned fossil fuel all the time or wood, which is just as bad.

Just: Yes, presumably you have to heat homes and run factory operations. I'm sure we could certainly cut our power demands in half, but it's very hard to visualize our going back to a place where we wouldn't have to be generating vast amounts of power somehow. Of course, potentially, solar energy could handle the job, but solar energy is an expensive business to carry on, on the scale that would be required. I visualize a future civilization which is depending on solar energy and wind power and water power requirements. It's a puzzle.

## Independent Consulting, 1958- 1959

Well, now to going back to 1958 and 1959 when I was consulting. I've written down a little list of some of the things I worked on. I did three jobs for the Shattuck-Denn Mining Company, which at that time owned an important zinc producer down near Prescott, Arizona but did not have any geological people. They sent me down to Venezuela to look at a gold prospect on the Guyana border.

Then they sent me to the Julapa District of Nicaragua. This was a very interesting district which certainly must have been one of the great contributions to Spanish gold in Spanish colonial days, because it was a large district of very rich gold mines. All of these mines had played out at the water table. There must have been thirty or forty of them in the district, all of which had been rich bonanzas, but they all played out at the water table. There was one mine which had found an ore body a short distance lower, below the water table. So Shattuck-Denn was interested in the possibility of getting into the district and reopening some of these old workings with a view to prospecting at greater depth.

Well, after looking over the evidence, I decided it was not a feasible venture, and as far as I know, nothing has been done down there to this day. But it was very interesting for two reasons. First of all, it tended to confirm the very controversial idea as to whether or not gold was ever involved in secondary enrichment as a geological process. The history of this district would seem to indicate rather clearly that there was secondary enrichment of gold, although I suspect that it was physical rather than chemical. The other aspect that was very interesting about it was that it must have been a terrific bonanza in the early Spanish days.

Then I also looked at a copper prospect down in Mexico, southwest of Tucson, near a town named Sasabe. I didn't deem it to be worthy of any development, so none of those examinations resulted in any activity.

Then I did work for Mr. Ludwig, the shipping magnate. The name Ludwig is rather current here in San Francisco society, and I believe that refers to his son. But he was a man who had achieved tremendous success in the development of bulk ocean carriers, and he was interested in developing cargo for such vessels. So as a result, he had learned somewhere about a possible iron deposit up the Abacura River in eastern Venezuela. I went down there and discovered that the so-called iron deposit was simply an ordinary iron-rich laterite and had no commercial possibilities, at least for our time.

He sent me down to Colombia to check into the coal fields near Cali, and there was a rather remote possibility of putting money into these. But he decided not to go ahead, so he never did anything about that.

Then he also sent me down to Honduras to examine an old gold mine which had been owned and operated by a very famous man in our oil field world, Earl Halliburton, who invented the scheme for cementing oil wells; it became universal. Halliburton had this ranch in Honduras and had worked on this gold mine, had worked it out. Then, if I recall correctly, after his death, the property had reverted to certain Honduran people. These people had done Mr. Ludwig some favors in helping him try to develop a pulp industry in Honduras. So in gratitude to them, he sent me down there to examine that mine which they had hoped could be reopened. Well, it was my unhappy duty to tell them I thought the mine was worked out. So that was that.

I also did a little job for the Costa Rican government to take a look at their bauxite deposits which Alcoa was trying to develop. But as one might expect, there was some leftist political opposition to their dealing with Alcoa, and they wanted my judgment as to what they should do. I investigated it, and I told them that in my opinion, Alcoa was doing a good job and that they ought to carry on with it. I don't know whether that report of mine had any influence on government policy or not, because it certainly did not silence the political opposition.

As far as I can recall, those were the different consulting activities I worked on, none of which produced any mines. All of them were negative.

Swent: How many languages have you learned?

Just: I knew French and Spanish from my school days. I picked up a working knowledge of Russian when I was over there, but I've lost most of it now. I can still handle French and Spanish pretty well.

Swent: So you were able to deal with these people in their own language in Latin America?

Just: Yes.

Swent: Did you keep any of your Japanese?

Just: No, I had a little smattering of Japanese words when I was a youngster over there. I can remember a few words, but I've never pursued it. I certainly couldn't claim any fluency in Japanese today.

Swent: Your French and Spanish must have come in handy for you, though?

Just: Oh, yes. Occasionally, the French was very helpful. For example, the year I was in Russia, I could talk with educated people in French even when I couldn't speak to them in Russian. Also, in Turkey that was true. Educated Turkish people had French taught to them in their childhood, so most of them spoke both English and French. So French has been useful as an international language, too.

Swent: Really it's just since the Second World War that French lost its status as the international language.

# IX PROFESSOR OF MINERAL ECONOMICS, STANFORD UNIVERSITY, 1960-1971

Just: About the middle of 1959 or the fall, I forget which--no, it would have been earlier. Frank Cameron of the St. Joseph Lead Company, who was a Stanford graduate, had told me that Stanford was hunting for somebody to take over their mineral engineering department, and would I be interested. I decided that, yes, I would be because consulting is a rather precarious business. So I decided I would come out to Stanford, and I did.

Swent: Was Frank Cameron the only person that you spoke to about this?

Just: Yes. The later negotiations were carried on by Charles Park, who was the dean of the School of Mineral Sciences at the time, now called Earth Sciences. This was all done by mail. I can't recall that I ever interviewed Park directly before I came out here. As I recall it, he took me on my record, and I came.

Swent: You had not met him personally?

Just: I had met him on one occasion on an airplane ride up from South America, as I recall it, but it was very casual, just the most casual acquaintance. He was interested in trying to build up mineral engineering at Stanford, which had fallen to a very low level. When I came out here, we had no undergraduates as majors in the department, and we had four graduate students. And that was that.

The department at that time included both mining and mineral processing and extractive metallurgy, but it was all at that very low level. The main metallurgical group, which changed its name to materials science, had left the School of Earth Sciences and gone over to the School of Engineering and left extractive metallurgy behind. So that came into my department, but it was at that very low level.

## Building Up Mineral Engineering

Swent: How does a change like that come about? The faculty members just decided they wanted to be in another department?

Just: Well, that change was made before I came, but they simply felt that the future was in what is now called materials science. They did take along with them one professor who, as far as I know, is still teaching extractive metallurgy, but it was a very minor aspect of their interests as they have conceived their future. So we also were handling extractive metallurgy as one of the options in the mineral engineering department.

As I've said, we only had four graduate students and no undergraduates at that time. We gradually built it up to something like twenty. Then when I was retired, we got "Fritz" [Fredrick] Kruger from the International Minerals and Chemical Corporation to succeed me, and under his leadership that number was approximately doubled.

But since that time, what you might call mining and process metallurgy and extractive metallurgy, all of those activities have pretty much fallen by the wayside again. So the department's name is now called "Applied Earth Sciences," and as far as I could tell you, it's chiefly concerned with hydrology and with mineral exploration from a geological point of view. I'm not aware that any mining course is still given, and if there's anything in the way of mineral economics being taught at this time, it would be absolutely different from anything I always thought of as mineral economics.

The whole effort to build up what you might call a mining industry department, that is, a department reflecting the activities of the mining industry, it eventually came to naught, or substantially naught, except for exploration. However, the department is doing well. In those years that I was active, I taught courses in the elements of mining, in mine exploration, in drilling and blasting, and I conducted a mining seminar, and I taught a course in mineral economics.

One of the important things we did, Charles Park and I got our heads together, and we decided to give the graduate students credit for courses over in the business school for some of their core courses. So our boys were encouraged to go over and take those basic business courses. This proved to be a very useful thing. It helped these young men. Most of them went on to

A geologist's workday doesn't end with the setting of the sun. In a rustic cabin in the Cascade Mountains, Evan Just reviews the day's findings and plans his travels for the following day. [This cabin has since been buried by ash from Mt. St. Helens.] 1966.

*Photograph from Weyerhaeuser News, November 1966*

successful careers where that combination of mining technology and business practice proved to be very useful. So our graduates of those years had very good success when they got out into the world.

## Memories of "Ma" Perkins, Presidents Roosevelt, Truman, Hoover

[Interview 4: March 17, 1989]##

Swent: We wanted to pick up a few little things that we had neglected to include earlier. Would you like to begin with telling about meeting "Ma" Perkins in the Tri-State District?

Just: During the late thirties, there was a group of people who were considered at that time to be a Communist front. They were called the National Committee for People's Rights. I think they were mainly a group of well-meaning liberal people who, to some extent, the Communists took advantage of their innocence. In this particular case, they took aim at the Tri-State Mining District as a kind of a hell hole for the miner.

The Mine, Mill, and Smelter Workers, which at that time was Communist led, was trying to break into the district. They were trying to oust a unique union called the Blue Card Union which was composed entirely of supervisors, as far as their officials were concerned. This, of course, was not an acceptable union from the standpoint of the National Labor Relations Act. But this Mine, Mill and Smelter Workers took advantage of this National Committee for People's Rights, and they arranged to have the secretary of labor under Roosevelt--what was her first name?

Swent: Was it Frances?

Just: Frances Perkins, yes.

Swent: But everybody called her "Ma," didn't they?

Just: That's right. So it was announced that Ma Perkins was coming down to look at this place where all the miners were being so terribly abused. They showed a film, I remember. This film showed pictures from the dust bowl out in the panhandle country in the early part of the thirties which had no relevance to the mining district. They portrayed us as being careless about silicosis and keeping the miners downtrodden, which was simply not true.

Our own association was monitoring the dust conditions in the mines constantly. I think it's quite truthful to say that the mine operators were doing a conscientious job to keep the dust counts within permissible limits.

Swent: When had they begun to be so concerned about the dust?

Just: Well, actually, this goes back to about 1912. Prior to that time, the conditions were truly horrendous in the mining field. Even though the mines are in limestone and dolomite, the ore is siliceous. So under the old conditions of mining without the water sprays, with so-called dry drilling, the dust condition was truly hazardous. I remember a doctor who had lived through that telling me that the typical life of a Tri-State miner was five years in those days.

Actually, in those days, the ailment was called "miner's consumption." The men usually died of a combination of silicosis and tuberculosis. Of course, because of all the silicosis, there developed a considerable seed bed of tuberculosis in the region. But at the time, it was not understood that siliceous dust was the cause of silicosis, and this discovery was made in the Tri-State District.

Dr. R. R. Sayers, who later became director of the Bureau of Mines, was in charge of the group that researched the situation and developed the knowledge that silicosis was a dust disease. Incidentally, the same discovery was made almost simultaneously in the gold mines of South Africa.

But when the Tri-State mining folk realized that dust was the culprit, they took steps about it. For example, the mining association hired a safety engineer who conducted a very active safety campaign. Then they instituted this dust counting, which was still going on when I became secretary of the association. We counted the dust in the mine workings constantly. So an honest effort was made to control the dust situation according to what were considered permissible limits.

In any event, this film caused a certain amount of excitement. They showed it to Ma Perkins in Washington, so she decided to come down and have a look. I urged our group, "Instead of being resistant to this, let's cooperate completely," and we did. We hired a bus and let Reed Robinson, who was the head of the union, tell where they wanted to go and what they wanted to see. A group of us, including the union representatives and myself, took Ma Perkins for a bus ride around the district. Then we also took her underground in one of the mines, so she could see for herself what the conditions were.

Nothing further happened there. Ma Perkins proved to be a very intelligent woman. I don't think she was taken in by this business, even though she attended a mining rally that evening and made a speech there. I wasn't present, so I don't know what was going on. But nothing ever came of it because we demonstrated that we were doing what needed to be done to control the dust conditions.

Swent: When did you meet FDR [President Franklin D. Roosevelt]?

Just: That was during the Engineering and Mining Journal days. That would have been his second or third term, I guess. It would have been during the early forties. A group of us, something like thirty or forty, visited him in his Oval Office. This was always very interesting to me, because even though I had voted for Roosevelt on his first election, I subsequently decided that he was a liar and was too far to the left. So I really was thoroughly oriented against him when this happened.

We filed into the room, and he shook hands with each of us. I can only describe the experience as hypnotic because when he took your hand and shook it, you were simply captivated. You were done in. He had a large hand and a very genial smile, and it just made you feel instantly just as though you were hypnotized, as though all these adverse thoughts couldn't possibly be right. You were simply taken in.

We stood around, and he talked to us about some matters which were on his mind at the time. I was so amazed at this mental transformation that I wrote a little story about it. This feeling of admiration for Roosevelt wore off, and I was feeling adverse to him again by the time a second visit occurred. The same thing happened over again.

I remember also, not very much later, a congressman made a remark that was rather interesting. See, the president was accustomed to hosting the new members of Congress. So when the new Congress convened--and one of these congressman said, "There ought to be a law against a man like that." He was so able to charm people by his personality.

Swent: Did he know your name? Was that part of it, that he called you by name?

Just: No. I also met [Harry S] Truman, but not as president. It was during the war when he was a senator. He was head of an important committee in Congress that gave him a lot of publicity, and it's that publicity which led to his being selected as vice president. But I was not at all impressed by Truman. He didn't seem to me to be either senatorial or presidential or vice presidential caliber at all, which is rather interesting because a good many people today, in retrospect, think that Truman was a great president.

Swent: He did have some interesting confrontations with John L. Lewis and the mining industry.

Just: That's right. He defied Lewis, and as I recall, he broke one of the coal mining strikes. Well, he had guts; there's no doubt about that. It took an enormous amount of guts to make the decision to use the atomic bomb, for example. So he had that. As a matter of fact, you may recall that he originated the phrase "the buck stops here," which indicated his willingness to make tough decisions.

Swent: Did you know [Herbert] Hoover at all?

Just: Herbert Hoover? Not during his presidency but during my years in New York, Hoover was there most of the time living at the Waldorf Hotel. Every now and then he would come down and talk to us at the Mining Club. I always felt very sorry for the man because he had been grossly mistreated by Roosevelt in Roosevelt's first term by blaming Hoover for the Depression; all that kind of thing. That was just a terribly false accusation. In those later years, you could see it in Hoover's bearing, how he was suffering from that treatment that he had received, and he was always rather defensive.

I remember his telling us more than once that what he believed in was the uncommon man, whereas the Administration was stressing the common man. I remember Henry Wallace in particular proclaiming the "Century of the Common Man." I always sided with Hoover's point of view, which I think was well taken, that the advancements in civilization are not made by common men, they are made by uncommon men.

He also told us of some of his experiences when he was in charge of supplying food right after the war to the starving European people. One thing he mentioned I always thought was interesting, was that the thing you had to get to them as fast as you could was fats. That's what they suffered from most, was a deficiency of fats in their diet. That seems interesting simply because today everybody's trying to avoid fats in their diets and worried to death about cholesterol and all that.

Swent: Was he still here at Stanford when you came?

Just: No. As I see it, Hoover was simply the victim of a cyclical economic condition for which he was unfairly blamed, very unfairly. Roosevelt simply heaped it on him and, you might say, damned him for all time in the eyes of the public as the architect of the Depression. That wasn't fair.

Swent: I think you said you had some contact with him when you were at Cyprus?

Just: No.

Swent: You had some recollection of a property that he had--somebody had brought a property in to Cyprus, and Hoover had--?

Just: Oh, that was his son. Yes, that was Herbert Hoover, Jr.

Swent: I see. He was also a mining engineer?

Just: Yes, but he was the head of a geophysical firm at that time called United Geophysical. They had discovered the Pima Mine which later was taken over by Union Oil, and then Union Oil dealt control of it to the Cyprus Mines Corporation. Cyprus Mines invited Utah Construction in, so it developed as a partnership between Cyprus and Utah. But that was Herbert Hoover, Jr. Hoover, Sr. had died by that time.

Swent: Did you know any other presidents?

Just: No. We met two or three times with another vice president, with Henry Wallace. This was to me rather odd because we would gather in a meeting room around a long table, and Wallace would be led in by some aides almost as though he were an incompetent. He didn't act very competent on those occasions when we interviewed him. Whether the man was suffering from some ailment, I never knew, but he certainly didn't seem to be all there. I don't think of any other public figures that would be worth talking about.

Swent: I would like you to repeat that little story about applying for a visa after you had left Russia.

Just: When I was in the U.S.S.R. I grew a Van Dyke beard just for the fun of it, and I kept it when I came out. I came out through

Finland and Sweden and then to Denmark. Then I was going to the United Kingdom.

When I went to the British ambassador for a visa, he looked me over and said, "I don't think I'm going to let you go to the United Kingdom. You look to me like a dangerous character." Well, I was rather taken aback by that and tried to argue the point. He finally said, "Well, you'll have to go around to the American embassy and get an okay from them before I'll give you a visa," which I had to do. Then I went to the U.K. without any further to-do.

Swent: How long did you keep the beard?

Just: Oh, as I recall it, I shaved it off when I was in the U.K. It was just for fun.

Swent: I would hate to think what the consular corps would go through now if they had to question every bearded person who came through.

Just: I should say. It would certainly be completely out of date today. [laughter]

Swent: When you were in New York did you do any other things? We mentioned the Mining Club, and of course, I know you were active in the mining circles. But were you doing any social or civic things in New York of any interest?

Just: No, I had a full time job taking care of my editorial responsibilities.

Swent: Then later with Cyprus you were traveling all the time.

Just: That was a very demanding job, too, so I never had any spare time. In fact, I used to have to take work home almost constantly so that, really, my family life suffered to some extent from the demands of my work.

Swent: Speaking of family life, did your wife have any role to play in these things? Did she do entertaining?

Just: Oh, yes. My wife was always a very congenial person, and she was active in the Woman's Auxiliary of the AIME. We did quite a bit of entertaining.

Swent: Did she travel with you very much?

Just: Not on business trips. She went with me to Europe during the ECA days on one occasion, and I took her along on some of the mining trips in the West when I was with Engineering and Mining Journal, which she always enjoyed. She was an adventurous girl and very sociable.

As a matter of fact, I owe her an incalculable debt for what she did to change my life to be more sociable than I would otherwise have been. Also, I have always had a general leaning toward pessimism, I would say. Like, for example, I have been pessimistic over inflation ever since Roosevelt's presidency, and the roof hasn't fallen in yet. She was always an optimistic person, so it tended to give balance to my viewpoint.

So I owe her a simply tremendous debt in that respect. She always enjoyed any trips we took or any meetings with mining people.

She took a trip--I wasn't able to go because of my duties--she and my daughter took a trip down to South America on the ships belonging to Marcona Mining Company. They had a wonderful trip down there. Oddly, when they arrived at the port near the mine down there, it rained. It had not rained within the memory of living people, but it rained when she was there. Then they took a plane trip around South America, and when they got back, it rained again.

Swent: That is amazing.

Just: Yes. I don't know if it has rained ever since.

## Remarkable Mineral Strikes

I was going to say something about some of the remarkable strikes I have heard of in the mineral business. I believe I have already told how the Picher field was discovered in the Tri-State District?

### The Picher Field

Swent: I don't recall that you talked about the discovery.

Just: Well, I'll say it over again just to be sure. I was not involved in this, but it was a rather interesting thing just the same. The Eagle-Picher Company perceived that the Joplin area was beginning to decline, and there had been some small discoveries down in nearby Oklahoma near the town of Commerce. So they sent a drill down there, and they did quite a bit of drilling. Although they discovered a small amount of ore, they were not encouraged to proceed. But on the way back toward Joplin, the drill got stuck in the mud near Tar Creek.

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The driller discovered that they were on land which was under lease by the company, and he asked permission to drill a hole there simply because of the losses he had sustained by being stuck in the mud. He drilled a hole, and lo and behold, they ran into good ore and opened the Picher field by that purely fortuitous circumstance.

## The Fitts Pool

This next story is an oil story, not a mining story but rather interesting, the discovery of the Fitts pool down in Oklahoma. Not long before, the East Texas oil pool had been discovered, and it was the biggest thing ever found in this country. As far as I could say, it was the biggest thing ever found except for the Middle East. It was what, in geological parlance, you might call a wedge-out instead of an anticlinal structure.

This prompted a smart geologist in Tulsa, Levorsen--who later, by the way, became a head of the School of Mineral Sciences at Stanford. He was a chum of a good friend of mine, and I happened to know that he was a brilliant geologist. So he started searching for wedge-out conditions that might develop similar types of oil pools. He persuaded a group to drill in the Fitts area where there was a wedge-out according to his calculations of the Misener sand. Actually, when they drilled it, the Misener sand was unproductive, but they decided to drill deeper down to the Wilcox zone and lo and behold opened the Fitts pool. So in effect, he got credit for a discovery which was due to a miscalculation.

Swent: Not the first time that has happened either, is it?

Just: I guess not. I think the story of the discovery at Blind River is interesting, too. This developed during the time when uranium started to become of interest for warmaking purposes.

## Blind River

A well-known geologist who came from California but had transferred his seat of operations up to Canada, his name was Franc Joubin--he was aware that certain gold diggings had been done in this Blind River area just north of Georgian Bay that carried a little uranium. He also was aware that the rock which they had dug into there was very, very similar to the rock of the Witwatersrand in South Africa. By that time, uranium had been discovered there. So he had been the consultant to a group of people who were interested in looking into that situation and did, but decided not to do any drilling.

So when they pulled out, Joubin took his idea to Joe Hirshhorn, who was a mine financier in Toronto. Hirshhorn put up five thousand dollars for him to carry on drilling. I think it was the second drill hole, they ran into uranium ore downdip. See, they had discovered in South Africa that the uranium was leached near the surface, and you had to drill at a little depth to find it. That's just what they did at Blind River, and they ran into uranium very quickly. That opened the first Blind River prospect. Hirshhorn had an interest in a gold mine, and he was able to get them to shut the gold mine down and take the entire mining crew secretly over to Blind River. They checked 120 miles of outcrop with Geiger counters and staked three different locations, and that's what led to the opening of this Blind River field, in which I was so disappointed subsequently by being denied the opportunity to take control of the picture.

Another item that might be of some historical interest is that when I was in the Tri-State District, one of the operators there, O. W. Bilharz, showed me some assaying data that convinced me that the assayers were accustomed to fudging their data in favor of their clients. When ore or concentrates are shipped, the seller takes an assay, and then when they arrive at a smelter, the smelter takes an assay. Then, if there's disagreement between them as there almost always is, it can't be resolved simply by splitting the difference, they have what's known as an umpire assay, and that invariably falls in between.

He showed me a long record which indicated that the shipper assays were always high. Relatively speaking, the assays for the buyer were always relatively low and that umpire assays always fell in between. Now, that isn't chemistry; that's fudging.

I wouldn't be surprised if that practice still goes on today in those situations where, for example, an assayer sits right next door to a smelter and depends on the goodwill of the smelter for his business if he will fudge a little bit to keep them happy. By the same token, an assayer who is accustomed to dealing with shippers, he'll fudge a little bit to keep the goodwill of the shippers.

Swent: There's a lot in the sampling, too, isn't there?

Just: Yes, but sampling is not the cause. The sampler doesn't know where there may be good stuff.

Swent: I see, so it's just the assay?

Just: I think so. It's a silly little racket, but you can understand the reasons for it, very human.

Swent: So what did Bilharz do about it?

Just: Nothing.

Swent: Just became philosophical about it?

Just: That's right. I suppose it's commonly realized by people who are connected with this kind of thing all the time, but it was a revelation to me because you always think of assayers, you know, as simply being chemists who do their level best to give you an accurate result. But I'm convinced that this mild amount of fudging was a very standard practice, and for all I know may still be.

## National Mineral Policy

I might comment on something I read just since our last interview. I received the Mining Congress magazine, and I see that the new president of the Mining Congress is going to be gung-ho for a national mineral policy. They also believe that the mining industry must speak out more and tell its message more to the public and particularly to the Congress, and they must also gird their loins for a new battle over the Mining Law of 1872.

Swent: This is a refrain you think you've heard before?

Just: [laugter] Why I bring it up is that I believe I started all this yelling about a national mineral policy. I found out then, and I think the circumstances have demonstrated ever since, that you may get Congress to pass a law, but nothing ever happens when the law is passed, simply because there's not enough mining money and not enough mining votes to keep Congress interested.

Now, I was also one of those who always proselyted the idea that mining should speak up more, but the difficulty is that mining doesn't have the kind of money that would make a successful campaign for public sympathy. So I regard that as kind of a hopeless cause. Now, as far as how it was being represented in Washington is concerned, the American Mining Congress is a very good lobby for what I call a minority element, the mining industry being a minority group. I think they do a real good job, but they have to rely on information. The mining industry just hasn't got the money to buy enough politicians to really get attention from Congress.

Swent: Except in wartime?

Just: Well, then it becomes a matter of national concern that overrides, you might say, feelings of different congressmen or senators.

Now, on this mining law business, I'm really disappointed because all these years the mining industry has held an umbrella over people who have used the mining law for spurious purposes. They have resisted any amendment to the mining law that would get rid of all these bogus claims where people take up mining claims with no idea of mining at all but simply to build some kind of a motel or hotel or filling station or whatever and take advantage of the loose nature of the law to acquire a title. They might even do spurious assessment work, because after doing assessment work for five years, you can apply for a title.

I remember as an example of the size of the racket that has gone on in this connection, about twenty-five years ago the Bureau of Land Management decided to look into the situation here in California, up in the gold country. They started to dig into titles up there to see if there weren't a lot of titles based on false premises as mining claims.

Well, this investigation speedily opened up a picture that there were so many of these spurious mining claims that there was a terrific uproar. There were thousands of titles up there which are questionable because they were based on false mining claims. It made such an uproar that the government backed off and just shut the book. So those titles have never been disturbed. But the mining industry has always held an umbrella over those characters, and there's no good reason why they should. Incidentally, I suppose that old titles may be valid because of unchallenged occupancy.

On top of that, the matter of $100 worth of assessment work a year--now, $100 was a meaningful sum of money in 1872, but just think of what that is in terms of the modern value of a dollar. It's a ridiculously small amount to give a person the privilege of going in and holding government land. It's a disappointment to me that the mining industry seems to be in the habit of always fighting rearguard actions, and usually losing most of them, because they don't step forward and take a constructive step to help get rid of a racket.

Swent: There hasn't been a revision of the law since the twenties, has there?

Just: Not that I know of, and they are going to fight again to have it stay unchanged. There's no reason, as I see it, in modern times, particularly when there are so many other claimants for use of the public lands, that people should go in and simply hold title to land for doing cheap assessment work unless they are going to go ahead with development. Just the idea that you might do development five or ten years from now, it seems to me, should not be a valid basis for holding a claim. But mining folk, they just resist all change without any willingness to help reform the law and get rid of the nuisance aspect of it.

It seems to me that we have done the same thing with respect to acid rain. Now, certainly one of the principal causes of acid rain is sulfur pollution from coal combustion in power plants. That becomes a mining problem because the matter of cleaning coal of sulfur is usually something done by the coal shipper rather than the coal buyer. But like the Reagan administration has done in the past couple of years, they simply have dragged their feet without coming forward with any constructive steps to remedy the situation, which we know is developing into a very serious problem.

This acid rain is destroying forests all over the world, and something has to be done about it. I think we would be much smarter if we would take a step forward instead of simply being contented with the status quo or even resisting any change or fighting for delay. That's been our habit through the years.

I think we don't initiate reforms that have to be accepted. We don't participate in them or help initiate them when they should be faced up to and dealt with. So here we are at the same old stand yelling the same old battle cries. I suspect that one of these days, the mining law is going to be changed, whether we like it or not, and we'll be dragged into another situation kicking and screaming, offering nothing but resistance.

Swent: If it makes you feel any better, the principal investigator for this series is Douglas Fuerstenau. Do you know him?

Just: Oh, sure.

Swent: He's just been given a grant by the Department of Energy for almost $2.5 million to do research on removing sulfur from coal. So they are getting to work on it over at Cal.

Just: This type of thing should have been started five years ago when we first became aware that acid rain was a serious problem.

Swent: It probably took that long to get the grant processed. I'm sure it's been in the works for quite a while, maybe not five years. He is working on that now.

Well, let's get to your years at Stanford, then. We were just getting started on that last time. When you came out here, you had already known Charles Park, of course?

Just: Just barely, just barely. I came out here because Dr. Park had been in touch with Frank Cameron, who was a Stanford graduate and at the time was president of St. Joseph Lead company. He had asked Frank for some names, and Frank talked to me and asked if I would be interested. I said I would be, after some thought, and so I came.

Swent: Were there other people in the department?

Just: Yes, they hired another chap at the same time who is still there, a much younger man named George Parks. He's a mineral processor like Doug Fuerstenau. Then we shortly hired a metallurgist to take over the extractive metallurgy aspect of metallurgy. I know

I mentioned before that the metallurgy people had left the School of Earth Sciences and set themselves up in the engineering school as a Department of Materials Science. But they left extractive metallurgy behind, so we hired Norman Parlee to cover that function.

Swent: Let's go back into this business of the organization. In earlier times had Stanford had a College of Mining?

Just: No.

Swent: I think they just gave a general engineering degree.

Just: It was in the School of Engineering. Whatever the title was, I don't really know how the departments were classified. I know they had a Department of Metallurgy, and of course, they have always had a Department of Geology. I suppose there was a Mining Department or else a Department of Mining and Metallurgy.

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Swent: You mentioned that Mr. Steve Bechtel just died. You must have had contact with the Bechtels a number of times, didn't you?

Just: Only that I knew several people, mining people, who were in the Bechtel organization. I never did any work for Bechtel.

Swent: Did they have a very close Stanford connection?

Just: I don't know. There's a Bechtel House there. The international center there is named the Bechtel Center.

Swent: Did they do much with the engineering department?

Just: I don't know.

Swent: Well, we were talking a little bit about how the engineering was organized at Stanford. They don't have separate colleges; do they have departments or divisions?

Just: I don't know what it was in those earlier years. As I recall it, there was a reorganization when this petroleum geologist that I mentioned, Levorsen, came in. They called it the School of Mineral Sciences at that time. I said Earth Sciences a moment ago, but it was called the School of Mineral Sciences. That included geology and petroleum engineering and geophysics. As I recall it, mining and metallurgy were lumped together in a single department.

Since that time, the school has been named the School of Earth Sciences rather than Mineral Sciences.

Swent: So did you have any connection with, for example, the Department of Mechanical Engineering?

Just: No, that's a different school. That's the School of Engineering, and we were in the School of Earth Sciences.

Swent: Would this be an advantage to be separated that way?

Just: I don't know that. We would have been a separate department in any event. I don't think it made much difference. Of course, mining engineering is very close to engineering in general, but it's also very close to earth science. So if you're going to separate earth science from engineering, your mining group has got to go one way or the other.

Swent: What about the fight for money?

Just: I was never aware that that was a particular problem. There was something of a problem in that the provost at that time, who was a Dr. Fred Terman--who was in electrical engineering and, of course, is considered to be the father of the Silicon Valley business, having started that off--but Dr. Terman never thought too much about mineral sciences. I think our dean always had some difficulty with him.

Swent: Who was the dean?

Just: Charles Park.

Swent: Often it's the allocation of funds that really brings out the difficulties in these things, isn't it?

Just: Yes, and they just didn't get on very well. There's a little aftermath of that. After Dr. Terman retired, I remember he was asked to give an opinion over in Colorado about the Colorado School of Mines. He caused consternation over there by suggesting that it be abolished, and it caused a big uproar. [chuckles] It never was abolished, but he recommended it indicating his lack of enthusiasm for mining people, I think.

Actually, I think the lack of accord goes back to the time when Theodore Hoover, Herbert Hoover's brother, was dean of engineering at Stanford. He didn't get on with Professor Terman, so the divergence of viewpoint has old roots. I don't know what it was all about. I never was concerned with it. We department heads never had to get into the money fights, so it was simply out of my camp.

Swent: You said that when you came there were no undergraduate students and four graduate students. What graduate degree was given at that time?

Just: Mineral engineering.

Swent: The master's, or were you giving a doctorate also?

Just: Yes, we were eligible to give a doctorate. Nearly all of our graduate students were master's candidates. I had two doctoral candidates in my experience there. One was a Japanese lad who came over and did some explosives research under my direction.

Swent: That was another thing I wanted to ask about, foreign students and foreign professors.

Just: A good share of our graduate students within my time have been foreign, and I think that's true today, a substantial share. We had quite an influx of boys from Germany and some from South Africa, Egypt, Morocco, Pakistan, and Canada. The school had foreign students from all over. We had a few from India also in our department. That seems to be true in all the universities all over the country as far as I've observed. There's been a very heavy influx of foreign students.

Swent: And of foreign teachers also.

Just: Yes, well, subsequently they have grown into teachers.

Swent: Were there any women in the department when you were there?

Just: No. Mining engineering has never been an attractive field for women. I mentioned in some of my early experiences that we had two of them at the University of Wisconsin. They are the only women mining engineers I ever heard of. There's a fair number of women getting into geology and apparently doing very well, but I'm still not aware of any in mining.

Swent: I think there are some, perhaps not here but at other places.

Just: To some extent there's an unhappy tradition about this. For years there's been a miners' superstition that women should never be underground in a mine. In fact, I got into hot water on one occasion. I had a party of students over at Bishop, California at the tungsten mine over there, and there were a couple of girls in the party. The boss man--I can't remember his name now--he had said the women can't go underground.

They were the wives of some of the students. They were not students, but they were hoping that they could go in. "Well," I said, "the boss says you can't," but we let them ride in the bus up to the mine portal which was a considerable distance up the hill from the office. When we got up there, the men in charge up there didn't think it would be any big deal, so they took the women in. When we got back down to the head office, the general superintendent was just as angry as could be. He was very, very angry about all this. That was just, as far as I could tell you, all about this fear that if an accident would occur within the next few days that the miners would say it's because they had let women underground.

I don't know to what extent that keeps women out of the mining engineering profession, but of course, it's just stupidity. However, mining doesn't seem to me to be a particularly appropriate place for women. I mean, in actual mining engineering where you're underground and sometimes under fairly tough conditions. It would seem to me that women could find more congenial places to work.

As I mentioned before, the department grew to something like twenty.

Swent: How did you manage this growth?

Just: You raised that question before, and I mentioned we did one thing at the beginning of my tenure there. Dr. Park and I decided that we would encourage our mining students to go over and get some of the core business courses. It proved to be very helpful to them. How such things get around I don't know, but I suspect that that had something to do with the increase that we got. But it was never advertised any way that I know of. It's just whatever happened, happened by word of mouth.

At least the department grew. Then when Fritz Kruger, my successor, took over, during his regime that group was just about doubled, so it got up to around something close to forty students, including a few undergraduates.

Swent: Did you recruit Fritz Kruger?

Just: Yes.

Swent: How did you know him?

Just: He was a vice president of International Minerals and Chemical Company. I had known him for some years. In the most recent contact, he had persuaded me to come back and give a talk to their company group that had a meeting there, and I gave a talk about the outlook for the mineral industry.

Swent: Which brings me to another question I had. What sort of contact did you maintain with industry?

Just: At Stanford?

Swent: Yes. You personally and also as the school?

Just: Well, I used to go to mining meetings and mingle around and give an occasional talk. I remember one called "Gold and the Welfare State" which was published by the Mining Congress Journal. I also carried on a series of studies indicating that the mining industry simply was not reaping a reasonable profit. I had a lot of statistical evidence to indicate that mining was--in spite of the fact that it should have an extra profit to overcome depletion--it was actually, in the gamut of industrial groups, near the bottom as a profitable industry.

Swent: Did you have any consulting jobs at the time that you were at Stanford?

Just: I worked for the Weyerhaueser Company. I worked about five or six years with them looking for minerals on their extensive land holdings.

Swent: This was in the summer?

Just: Yes. I had a few other little consulting jobs. I believe I mentioned them before.

Swent: Well, you mentioned the ones that you had when you were in New York before you came to Stanford.

Just: Oh, did I? I did a few small jobs. For the Natomas Company, I looked at the Gold Beach south of the mouth of the Klamath River. I remember doing that.

Swent: Were you able to tie any of this in with your teaching?

*Photograph by Weyerhaeuser Company*

*At left and below:* Evan Just, at work in the Weyerhaeuser woods, 1966.

Just: This was just a matter of a weekend or something like that; didn't amount to much.

Swent: Did you use graduate students as helpers?

Just: It never got that far. Then I looked at a gold prospect, also for Natomas, up in the Trinity Mountains. I remember that, too. But both of them were forlorn looking prospects, and there was never any work done on it, I mean by anybody connected with me.

Swent: You mentioned a copper prospect that you found for Weyerhaueser.

Just: Actually, I didn't find it. Some surface evidence had been discovered by a man that they had employed earlier who had died. I can't remember his name now. So what I did was simply check over the area more extensively by surface sampling, and then we drilled it. That was the end of it. It's still up there.

They had some different suspicions of mineralization; however, they were not economical. So the things they had in mind that they had recognized before my working with them, none of them had commercial possibilities, except rock, sand, and gravel.

Swent: This copper project that you mentioned earlier would have been commercial in an earlier time perhaps?

Just: No, but it might be commercial in a future time. I don't know. You can't tell what will be commercial fifty years from now.

Swent: What were the constraints?

Just: Marginal grade, and also, as I said, a very serious environmental locale.

Swent: Which might not have been a deterrent in an earlier time?

Just: That's true, but the grade could never have been mined in an earlier time.

Swent: But people wouldn't have considered the hazards to fish.

Just: No, that's true, or they might have glossed over them.

Swent: You had mentioned that if there was a prime fishing locale on one side and a municipal water supply on the other, I suspect that in an earlier time, the fish wouldn't have been considered; the municipal water would have.

Just: Yes, but in this particular case, they could have easily avoided drainage to the municipal water supply. The deposit is largely on the drainage that goes into the Snoqualmie River, which is very popular in the summertime with picnickers and fishing people.

Swent: Did you do anything about finding jobs or helping your students to find jobs?

Just: Yes, I always helped them whenever I could, but they never needed much help. Most fellows found jobs very readily. They did very well. I'm quite proud of the record which our students established here at Stanford.

Swent: Did your contacts with the industry help them at all in this?

Just: To some extent, I think, yes. I was always happy to write a letter for a student. Occasionally this paid off. In most instances they didn't need that help. They found jobs, and they went ahead very well. That combination of business teaching and mining technology was a very good combination.

Swent: This was one of the very few places in the country that offered mineral economics, wasn't it? Your course was one of the few in the country. Somebody told me there were only three, and I don't know what the other two were.

Just: Columbia had a course and Pennsylvania State University had a curriculum in mineral economics.

Swent: But in the West, this was the only one?

Just: As far as I know. I might say that Charles Park taught an economics course as well as myself. We both had courses in that subject. I think that was helpful, too, to students. It's helpful to anybody in earth sciences to have a background in the economics of the industry. It was helpful, I'm sure.

Swent: What sort of linkage did you have with USGS [United States Geological Survey] just down the road?

Just: Oh, just a friendly relationship. I don't have any contacts there now anymore. I had a great friend over there, D.F. Hewett, who was one of the grand old men of the Geological Survey. He had an office out there. He was retired. He and I used to have lunch together frequently, and I used to be in casual contact with four or five others over here, largely because of my strong friendship with him. After he died, I just gradually lost contact.

Swent: Did your students get jobs there?

Just: There are a few over there. There was one, she was one of my course students. This is a girl, Carol-Ann Hodges--she's over there and has done very well. But she was a geological major who simply took mineral economics with me. She was not in our curriculum.

Swent: So most of your students went into the industry?

Just: Yes.

Swent: Did industry come to you with projects, for instance, or grants; did you work on specific things that came as suggestions from industry?

Just: No. I've already mentioned my effort to start up a work-study program there, and I had enough mining industry people willing to cooperate with the work-study program. But I couldn't find any students who would get into it. It seemed to me to be a shame because I think it's a splendid idea.

Swent: Which companies were interested?

Just: I don't remember.

Swent: This would have been having students working during vacations?

Just: No, it's a program that would take almost six years instead of four years, but they would have had a substantial amount of industrial experience and also enough pay to pay their own way through school. I think it was a splendid idea. This was a scheme developed by Antioch College in Ohio. I was very much disappointed that I couldn't find any students at Stanford who were interested in undertaking such a course or such a curriculum.

As I've mentioned before, I'm afraid that the students that come to Stanford are by and large not looking for hard work jobs, I mean hard physical work jobs. As you know in the public mind, they think of mines as dirty holes in the ground and all that. So it didn't work. As I said, I think it's a shame that it just didn't happen, and that was that.

Swent: Were there research projects of any kind?

Just: Yes, some of them involved cooperation with mining companies. Most of the master's theses that we had in our department--either the students brought the ideas with them, or else, at least those that worked with me, worked on mineral economics as subjects. We didn't have very many that had direct industrial connotation.

Swent: What would be an example of some of the theses that were done? Do you remember?

Just: Many of these were intensive studies of a particular mineral or mineral group: its geology, its usefulness, its properties, its marketability.

Swent: So then they would go to a company that dealt with that particular mineral?

Just: Sometimes, yes. A good many students brought their own thesis ideas with them.

##

Just: I remember one whose name was Jerry Whiting. He was a lad from the University of Idaho who had been on the faculty there and came down here for a doctor's degree. He has since been a consultant most of the time and still is.

Swent: He was one. You said there were two?

Just: Yes, I mentioned the Japanese student, Kazuo Aso.

Swent: Oh, yes.

Just: He's now teaching at a university in Japan at Akito.

Swent: What was the university like at the time? I'm trying to think, this was 1959 to 1966, so you were just getting into a pretty stormy time?

Just: Stormy time at the university?

Swent: The sixties were generally turbulent on many campuses.

Just: Oh, that's right. Of course, our particular students were mainly graduate students, but even in those departments like geology which had a fair amount of undergraduates, I'm not aware that they participated in any of this violence. But there was a good deal of window smashing on the campus at the time and the defacement of buildings and statues and all that kind of thing. As far as I ever learned, this was largely due to young hoodlums who came out from the town, rather than students themselves. Though there was a certain amount of student participation. I'm not trying to gloss that over.

I remember our School of Earth Sciences, the Mitchell Building, has some beautiful windows that are two stories high in the library, and many of them were smashed over and over again. Each one of those windows must have cost hundreds of dollars to replace.

Swent: I think it became worse after you retired, didn't it? You retired in 1966?

Just: Yes. Yes, I think it did.

Swent: You were just in on the beginning of it, maybe?

Just: You see, I was teaching for another five years anyway.

Swent: Oh, you continued after?

Just: Oh, yes, I continued after my retirement.

Swent: On a lesser basis?

Just: Yes.

Swent: I see, so you were there through the bad time then?

Just: Yes. I always felt that the university was rather weak in their resistance to this outrageous behavior. But they always temporized with these vandals. I've often wondered since, if this happens over again, with all those beautiful Rodin statues, for example, scattering the campus. What would happen to them? Thank goodness there hasn't been that type of eruption since.

Swent: So you were teaching just mineral economics then after 1966? Did you continue to advise students? What difference did retirement make to you?

Just: Well, I didn't teach as many courses. I carried on a mineral economics course, and my recollection is that I carried on a seminar, too, a mining seminar. I also kept teaching drilling and blasting for a while.

Swent: Did you do field trips other than to Bishop?

Just: I organized some extensive field trips when I was there. I used to take students as far east as Utah and Arizona. I had two different trips outlined that we would do on alternate years during Easter vacation. But I didn't do that after I was retired. That became Kruger's job.

Swent: How do you teach drilling and blasting in Palo Alto?

Just: It was largely on a textbook and theoretical basis. We didn't do any except that this graduate student from Japan, he worked out a research job on what's known as pre-split blasting. He would make up cement blocks about four feet long and two feet wide, and he would blast them up. So we had blasting to that extent, but we never did any practical blasting on the campus or anywhere nearby.

Swent: This is a field where there have been tremendous changes.

Just: Yes. But the changes have been more in blasting materials than in design of the drill patterns.

Swent: Have they come from academic research or from people on the job?

Just: Largely by people at working mines doing research. Almost every mine does a certain amount of their own blasting research. It's a very interesting field, and I think there's a lot to be accomplished in it. It's really still half done by guess and by God and half by scientific experimentation.

Swent: This is one of the areas where people got so excited about nuclear power. Remember, we were going to be able to have wonderful dams and so on.

Just: Well, that never happened.

Swent: No, but in the fifties this was the hope, wasn't it?

Just: Yes. We had great hopes for nuclear power in those days. Now the public resistance is so great, they can't even build an atomic plant. The cleanup costs that we're faced with are really horrifying. If the government went right ahead and cleaned up all those sites where they have poisoned the ground with their military program, it would run over $100 billion. A very substantial budgetary item. Every big nuclear power plant is going to have a similar cleanup problem whenever it becomes obsolete. In the meantime, as you know, the public is really resisting the construction of nuclear plants. There's been this big battle down at--.

Swent: Diablo Canyon?

Just: Yes, and back East there have been a couple of plants actually built that were never allowed to go into operation, one in New England and one down, I think, in Pennsylvania or somewhere down in that part of the world. So the future of nuclear power in the United States is very dubious.

Swent: When did you move here from Woodside Hills?

Just: In 1966.

Swent: Then after 1971 did you continue to do any consulting or have any contact with the campus at all?

Just: Oh, I've had a friendly contact. I get invited to their parties. I was invited to a party last week, but I don't bother them very much. I belong to an investment club on the campus called the Farmers' Investment Club. I've been a member of that for several years, and that's my main occasion for getting over on the campus these days.

Swent: They still like to preserve the fiction that Stanford is a farm, don't they?

Just: Yes. But I don't bother them over at the School of Earth Sciences very much. I don't think we old codgers ought to be getting in the way of the younger generation. Let them run their business without us.

Swent: Sometimes you're a wonderful resource.

Just: It can be. It can also be a damn nuisance.

Swent: What's the genesis of this Just Award at the AIME?

Just: They just created it. I'm not sure if it's still being given, is it?

Swent: I think so.

Just: Actually, Fritz Kruger suggested it. I've always been embarrassed by it.

Swent: Oh, you shouldn't be.

Just: I can't remember any specific reason why my name was attached to it. As I said, Kruger suggested it, and they agreed to do it. It embarrassed me. I never felt that important. I don't turn up at the awards anymore simply for that reason that I never felt very comfortable about it.

Swent: I think it's given each year to a student, isn't it?

Just: Yes, at least it was. I couldn't tell you whether it's been given the last two years or not. I don't go in to the meetings anymore.

Swent: Is Fritz Kruger still here?

Just: He's retired, too. He's been retired for over five years, but he lives over in Woodside Hills close to where we lived. Charles Park is retired. He lives in Channing House in Palo Alto. So gradually, the people I know over there in the School of Earth Sciences have been pretty well rotated out. I feel almost like a stranger over there now. They're always very cordial. They're very, very kind to us emeriti, and all I can say is that all of my relationships with Stanford have always been very good. It's a fine institution, and God knows, they certainly treated me well. I'm proud to be associated with it.

Swent: What were your relationships with Cal?

Just: I used to visit with them over there. Of course, pretty much the same thing has happened, as far as I know, to mining over there that has happened over here. It's gone into decline. I think it's been years since they have had a professor of mining over there or a mineral engineer or anything like that. Fuerstenau's still there, and he's quite active.

Swent: He's a metallurgist.

Just: He's a mineral processor.

Swent: They still have mining engineering.

Just: They do?

Swent: Yes, and their professors are, a number of them, from the United Kingdom. They're from England or from Scotland or from South Africa.

Just: The ones I knew have been long since gone. I thought that the curriculum had been abandoned, that is, the mining part of it.

Swent: Well, I just looked it up to check to be sure the other day. They have ceramic engineering and engineering geoscience, extractive metallurgy, petroleum engineering, physical metallurgy, mineral processing, and mining engineering. Those are the programs in the Materials Science and Mineral Engineering Department. Those are the chairs that they have.

Just: I don't know the people. The only person I know over there anymore is Fuerstenau, and I haven't seen him in years. I think he's quite active still with the local section of the AIME. I used to be a regular. In fact, I was chairman of the group there at one time. In recent years, I have fallen by the wayside.

Swent: Just one other question for my own information. If a student in your School of Earth Sciences wanted to take engineering classes, they could still take other courses, but they would have to go to the other school?

Just: It's no big deal. They would get credit for it if it were an optional subject. But there's no hard feelings. I always had cordial relationships with the engineers, certain ones over in engineering, particularly civil engineering. I never had anything particular to do with electrical or mechanical engineers.

Swent: In fact, your students would almost have to take some courses in the other departments, wouldn't they?

Just: Well, the undergraduates, yes. As I've said, most of our students have been graduate students, and most of them don't need that except that we encouraged them to go to the business school. Most of them have had a pretty good technical background when they get here.

Swent: What did you enjoy the most? You've had such a varied career in industry and then editing and then teaching. Which segment of your career gave you the most satisfaction?

Just: I would say my Engineering and Mining Journal work and teaching. I would just about split it between them. Then the work with the Marshall Plan was interesting but not enjoyable because when you have to deal with the Washington bureaucracy, life can get very unpleasant if you want to get anything done. If you just want to sit there and shuffle papers, it's a fine life.

Swent: It had some lasting results, however, didn't it?

Just: Well, I don't know what to say about that. The main thing, we did set up a bauxite industry in Jamaica. This would have happened sooner or later. Of course, much of the stockpile work, these days they're liquidating the stockpile, and with good reason. You see, the stockpile was intended to provide a cushion for an industry-backed war, such as the Second World War and to some extent the First World War was. It was industrial strength that brought us through.

The stockpile was intended to provide a cushion until enough productive efforts could be generated to give us our necessary supplies. But when you're facing nuclear war, the need for a stockpile pretty much evaporates. For one thing, you can expect the destruction of the centers of consumption. So you probably would actually have a surplus of minerals on hand, rather than a deficiency, in a nuclear war.

So the whole picture has changed, and they have been gradually liquidating the stockpile. I don't really have any idea how big it is compared to what the goals were in the fifties and the late forties. I know they're much reduced. There's not much emphasis on stockpiling these days for the very reason that it's not appropriate to a nuclear war, and that's what we're thinking of when we think of ourselves going to war.

Swent: It isn't relevant to peacetime?

Just: The U.S. stockpile was never dedicated to that purpose. It has been used occasionally that way, but it wasn't established with that intent. It was established as a wartime precaution.

Swent: It wouldn't help in leveling out the market conditions?

Just: I'm not sure that this could be done, except on the basis of a finding that it was no longer needed for the stockpile. See what I mean?

They did use the stockpile as a means of acquisition. For example, during Eisenhower's presidency there was some amount of turmoil over lead and zinc tariffs. As I mentioned before, the reciprocal trade people attacked zinc, and in so doing, they defied their own ground rules. In the reciprocal trade program there's an aspect of it that says when a finding is made by the tariff commission that hardship was created to an industry, that they would take steps to alleviate that hardship.

Now, during the Eisenhower administration, lead and zinc made a case for hardship to domestic producers from imports. Instead of modifying the tariff as they would ordinarily have done, the Eisenhower administration took some new supplies of lead and zinc into the stockpile as a means of getting over the surplus that was embarrassing the industry. You see the point? But it was on the input side. I'm not aware that they have ever dispersed any of the stockpile to industry except under a finding that it was no longer needed for the military purpose. Then, of course, in wartime they would liquidate it to whosoever would need it for defense.

But I'm not current on how much attention they pay to the stockpile anymore. I never hear of any new acquisitions.

I was reading in some of the material I've been going over since we were talking. I was interested, I found a newspaper item in the London Times how Mr. Just of the ECA had come over there to buy all of their surplus materials. Mr. Just was going to make a great, big splash spending $200 million to buy up their surplus materials. Well, nothing like that ever occurred. We bought maybe $30 or 40 million worth of materials, but that's about all.

I also have a clipping from the Joplin Globe saying that I had had this money to spend and couldn't find any place to spend it.

Swent: Was that true?

Just: Yes, it was true. We had the money. That was the so-called counterpart funds that we had to spend for stockpile materials. See, the counterpart funds would have been 5 percent of the total funds, which were $18 billion. Now, that would make $900 million in the 5 percent counterpart funds.

We had a first call on them, but at the same time, the State Department was competing for that money to buy new embassy sites and other things for the aid and comfort of the embassies. So we didn't expect that we would have all that money to spend. As a matter of fact, we couldn't even spend a couple of hundred million. I'm sure our expenditures never went over $50 million in the whole business.

Swent: Simply because the supplies were not available?

Just: Yes. When we spent dollars, we had a certain access to dollar funds, too, like in Jamaica and Zellidja. It didn't involve big sums of money. It was only $300 thousand in the Zellidja case. I can't remember what it was in the Jamaica case but no great sum.

## The University of Guanajuato, Mexico

I haven't mentioned that about 1980 I was invited to teach a course in mineral economics at the University of Guanajuato in Mexico, and did so for a semester in each of two years. Their mining school, which is Mexico's most eminent, wanted to initiate a master's degree, and this was to spearhead it. It was an enjoyable experience; the students were apt, the climate superb, and the town picturesque--one of Mexico's old colonial cities.

I was told at the outset that I could teach in English, as all the lads had passed English courses. It took just one class meeting to discover that this wouldn't work, and I had to get busy and brush up my Spanish, which I did, and got by very well. I would write the lectures out beforehand and pass them out. Then we would go over them in class together and iron out the linguistically weak spots between my Spanish and their English, and have further discussion.

Swent: Mr. Just, it has been a great pleasure to interview you. You have had a remarkably varied career; thank you for allowing us to document it.

##

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reprinted from Engineering and Mining Journal, April 1945 p. 131

"Minerals for a Teeming World"
reprinted from Chemistry, August 1965 p. 138

Reprint from Weyerhaeuser News, November 1966 p. 144

# A National Mineral Policy

## Why We Need One • How to Create It What It Should Include

**EVAN JUST**, *Editor*

AFTER CONSIDERABLE STUDY, we offer a basis for national policy on minerals. A sound policy, we insist, is essential to the best interests of both the nation and the mining industry. Many readers may disagree with the views expressed, some violently. However, before they decide that we would like to sell them down the river, or to serve special interests, etc., we urge them to review their own positions and decide if they are compatible with the country's broad political and economic situation and reconcilable with other legitimate interests within the mining industry.

The knottiest problem in the present picture has to do with the state of our mineral reserves and the extent to which national policy should lend artificial support to domestic production, by tax relief, import duties, subsidies, or exchange controls. In developing our position, we have paid serious attention to such views as those of Joralemon, Scrugham, Snyder, Wright, and other Western spokesmen, and have weighed them against such opinions as those of Bateman, Leith, Pehrson, and Wilson. We have consulted with a large number of leading mining men in all parts of the country, and a number of the highest officials in government. What we offer attempts to blaze a realistic trail through a wilderness of controversy. In so doing, we are primarily interested in providing a reasonable starting position for an organized effort dedicated to sound mineral policy, not in advocating any particular viewpoint.

Problems of national mineral policy are extremely complex. Recognizing that neither we nor anyone else can say the last word on these matters, we believe that wide consideration and free discussion are highly desirable. Therefore, we invite comment, either in confidence or for publication.

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# A National

## Why We Need One • How to Create It

A national mineral policy is needed to maintain world peace, to foster orderly, maximum utilization of our natural resources, to assure national safety, to promote equitable participation in the development of foreign deposits, and to prevent damage to domestic mining from short-sighted government action.

Sound national policy on minerals can be developed only through active cooperation between government and the mining industry. The latter must organize competent, representative standing committees dedicated to objective consideration of mineral problems.

**EVAN JUST**, *Editor*

## Lack of Policy Endangers Both Nation and Industry

It is time for the United States to have a mineral policy. In the past, because of the generous abundance with which the nation was endowed, we have been able to "get by" without a coherent or consistent national attitude toward minerals. What has passed for mineral policy has been a mere patchwork, inadequate for our modern needs and responsibilities.

If for no other reason, a competent mineral policy is necessary because of our future role as an active participant in world affairs. That we have shed blood and squandered our national assets in two world wars is evidence that we cannot escape the world and its problems, even if we would. Should we try, it is certain that the world cannot escape us. Because of our size and power, other nations cannot avoid the impact of our activities. They must either learn to live with us or conspire to protect themselves against us.

### A Menace to Future Peace

Because minerals are necessary to the economy of every nation but are unequally distributed and controlled, it is inevitable that they will enter into world affairs, military, economic, and political. Mineral problems constitute a "powder keg" in international relations, as nothing is more likely to cause a future conflagration than mishandling of the world's minerals. Nothing is more likely to start some nation on the road to international piracy than to be denied assurance of access to the minerals it needs to maintain its economy.

To have us participating in international affairs without a logical mineral policy is dangerous to ourselves and to world peace. Just as our capricious wrecking of the London Economic Conference upset the prewar world, so will uninformed decisions on minerals jeopardize future security.

On the domestic scene there is also a source of danger in an inadequate mineral policy because of the long time it takes for the effects to be felt. For example, we have been subsisting for nearly half a century with insufficient encouragement to discoveries, and still the public has been supplied with minerals at low cost by depletion of known deposits. If we wait for higher prices to foster exploration, we may experience a lag of decades before adequate reserves are built up again.

From the viewpoint of domestic mineral industries, lack of an informed national policy can be both annoying and expensive. Burdensome taxation, a repressive public-land policy, and tariff maladjustments can work serious hardships. Also, if the government stays in the business of regulating wages and prices, decisions made without full understanding of consequences can have painful results.

There have been too many instances where official decisions affecting minerals have been made with inadequate advice. To the extent that the mining industry has suffered from such developments, it can blame in part its own apathy toward public affairs. If this mode of behavior continues, we can expect to continue losing engagements by default.

# Mineral Policy

## • What It Should Include

Tax policies that encourage exploration and development.
Conservation through efficiency and maximum use.
A logical balance between domestic production and imports.
Modernization of protection for domestic industry.
Stockpiles for security and as economic cushions.
Enlightened participation in mineral cartel activities.
Improved government service to American operations abroad.
A public-land policy that fosters development.

## Mining Industry Must Organize to Insure Wise Policy

If the thesis is accepted that a competent national mineral policy is a necessity for the future, it is unthinkable that the task should be attempted without vigorous participation by members of the mining industry. Experience has demonstrated many times over that people not actively engaged in a given industry are unable to give its problems proper weight. Admittedly men "on the firing line" in industry frequently magnify their problems; thus sound national policy needs the attention of people whose views are not colored by competitive or "bread-and-butter" influences. Nevertheless, the fact remains that a mineral policy will not be competent unless it thoroughly sifts and weighs the opinions of industry men.

If this necessary job is to be done, and done right, it requires organization. This is partly because the views of individuals do not command much official attention, particularly when the individuals have selfish interests at stake. Also, no individual, unless he is a duly accredited spokesman, can effectively pretend to voice the considered attitude of an entire industry.

The mining industry, in terms of numbers employed, is small in comparison to its national importance. Also, it has special features to its economy, largely due to the wasting nature of its capital assets. These features are not shared by the big industries, such as agriculture, manufacturing, transportation, distribution, and service, which, by virtue of the numbers engaged in them, command due attention in Washington. Because of its small size and poorly understood economy, mining is constantly on the defensive in the national arena. This situation is evident today in the extent to which current official thinking on postwar trade problems emphasizes the interests of manufacturing and distribution, and is preparing to sacrifice the mineral industries thereto. To be heard in proportion to its actual importance, the mining industry must organize standing committees that will develop and express its views.

### New Type of Leadership Required

If any organization undertakes to assist government effectively in formulating national mineral policy, it not only must adequately represent the various groups composing the mining industry, but it must acquire the reputation among policy-making officials of viewing national problems objectively. It cannot mix selfish or sectional interests with the objective treatment of national problems without serious risk of falling down on one or both of these jobs.

Admittedly, it is asking a good deal to urge the various elements in a great diversified industry to organize for objective consideration of problems whose solution in the national interest may at times be injurious to themselves. This is asking nothing less than a radically different pattern of behavior, a genuine break with the traditional approach. However, the reason why we must develop a new type of behavior is compelling enough to demand serious attention. It is simply that we shall either learn new means of effectuating peace and progress, or, possessed of the frightful, destructive powers which technology has placed in our hands, we shall demolish civilization.

Beyond our individual stakes in living decently rather than being blasted into oblivion, there are other selfish reasons for objective collective action. If we perceive self-interest in adequate perspective, we will realize that no industry or segment thereof can operate contrary to sound public policy without getting itself into difficulty. The possibility that hardship may be created at times for some producers if they acknowledge that the interests of the nation are contrary to their immediate objectives is not a valid reason for unwillingness to enter into the formulation of national policy. Decisions must be made, and if informed people fail to help make them, they will be made without full understanding of the consequences. Certainly there is more danger to business interests from having their destinies ruled in ignorance than in policies guided by the objective application of informed judgments.

# Object: to Integrate Interests of Industry, Nation, World

To discuss any kind of domestic mineral policies is more or less academic if the industry cannot look forward to substantial relief from the crushing tax burdens it now bears. Continuance of current taxes will simply annihilate private enterprise in mining, as there is no reasonable possibility of gain by assuming the risks of mine development in the face of taxes the industry now pays.

## Tax Relief Is Necessary

However, we are all aware that the same fate will await private enterprise in general unless substantial tax relief is obtained. The sinister impact of Uncle Sam, the tax gatherer, is currently cushioned by the fact that he is all industry's big wartime customer and spends twice as much as he collects. After the war, when industry must go back to ordinary customers, even going businesses will be hard pressed to pay half the present tax bill. The drop in government purchases at such tax levels—given a balanced federal budget—will be about equal to the entire national income in 1940. Maintenance of present tax rates would make new business risks of any kind sheer absurdities.

Because the minimum taxes that can be expected will be very serious burdens, we can anticipate a general clamor for tax reductions. Therefore, the mining industry will find stubborn resistance from a harried Congress to its requests for special relief.

Nevertheless, the low rate of mineral discovery, particularly of important new mines and districts, is a matter for serious national concern. In the public interest we believe that important new incentives must be furnished to stimulate exploration. Under the circumstances that will probably prevail, it will take united, vigorous action by the mining industry to convince Congress of this need.

Beyond maintenance of present depletion allowances, two things are needed to stimulate mineral exploration and development. One is downward revision of the capital gains tax. The other is a three and one-half year exemption from income taxation for all new mining ventures. The latter is not a wild idea. It was actually practiced in Canada before the war and was successful in producing the desired results. The exemption not only stimulated prospecting to a noteworthy extent, but income from the resultant productive operations actually increased total tax revenues. If Canada, whose mineral reserves are far less depleted than our own, found it profitable to grant such tax relief, it would be even more appropriate here.

## Conservation Through Efficiency

The mining industry will be very foolish to underestimate the movement which sponsors the idea that we have become a have-not nation in minerals, and should apply drastic conservation measures to those that remain. This viewpoint stems from people engaged in manufacturing, and has effectively penetrated Washington economic thinking because most officials and economists understand manufacturing but not mining.

People sensitive to manufacturing and distribution problems, who are trying to piece together a postwar pattern which affords hope, almost universally conclude that we cannot have high employment unless exports are greatly increased over prewar levels. They have also become aware that we cannot have healthy foreign trade unless exports and imports are more or less in balance. It never occurs to them that their own industries might logically bear a portion of the burden of increased imports. Thus the idea of have-notism in minerals and of balancing manufactured exports with mineral imports dovetails beautifully into their picture. and even affords some hope of obtaining raw materials at lower cost.

As we have already stated (*E.&M.J.* Feb., pp. 91–92), the idea of balancing the desired level of exports with mineral imports is probably a practical impossibility; nevertheless, we are certainly going to be asked if the nation can afford to continue rapid depletion of essential mineral resources whose economic reserves seem to be less than our total needs for the next 20 or 30 years. As the group most competent to pass on this problem, we have a duty to provide an answer based on a national viewpoint and aimed to cover all reasonably possible national risks.

Those of us who are versed in the mineral industry know that the popular view of our state of have-notism is grossly distorted; but common sense forces us to realize that our self-sufficiency seems to be facing its declining years. This is particularly so because our consumptive requirements are still increasing. We cannot shrug off the declined rate of discovery and we all know that mines, tenacious as they are, eventually play out.

Nevertheless, after weighing the probable consequences of various means of conserving mineral resources, it is our judgment that the truest conservation lies in orderly and maximum utilization. The idea of locking minerals away for future need by killing off the extractive industry has three important flaws: (1) Given adequate time, modern technology can find substitutes for any commodity; (2) It takes a "going" industry to make the technical and managerial gains which enable economic utilization of lower and lower grades of ore. The pilot-plant scale of operation is not adequate to achieve this result to an optimum extent; (3) The emergency needs for which "lock-up" conservation would presumably be practiced cannot be met without established plants and trained personnel.

We must also recognize that the cure will be worse than the disease if a sudden change in the rate of production disrupts either a great industry or important segments of the country. Obviously, the region most affected by drastic conservational policies would be the mining West. The people of the West have a right to expect stability of their economy, and population growth rather than decline. Thus, it would be unfair to injure their established industries until others arise to employ their people and sustain their economy.

Furthermore, considering only the selfish interests of the manufacturers and distributors who have a stake in low-cost raw materials, it would be suicidal to jeopardize the important established markets of the West in order to facilitate trade with people to whom an old oil tin is a precious utensil. The development of foreign backward areas into important markets for American consumers' goods is bound to take many years, if not generations. How will the manufacturer whose established market is injured meet his payrolls meanwhile?

Another aspect of the conservation problem is that of the marginal mines. Certainly, it is fruitless to hope that the public will pay the price necessary to keep in operation all the mines brought to life by wartime demands. Nevertheless, there are some which in the public interest should be kept open and maintained, if not operated, on the assumption that their resources will eventually be needed, and rehabilitation after abandonment would be an expensive alternative. The problem applies not only to wholly uneconomic mines, but also to marginal parts of better mines, where normal operations might leave poorer portions inaccessible. Naturally, each property is a separate case, and the sifting of cases which warrant a subsidy is an appropriate subject for consideration by a committee as suggested above.

In short, we believe that a logical conservation policy will aim at scientific research, operating efficiency, active exploration, and effective use. These alternatives offer more opportunity for maximum development of mineral resources and national safety in case of emergency than "lock-up" conservation. True, the latter would assure a limited reserve, but the same would not be quickly available. Also, such a policy would stifle the processes which have made available most of the minerals we have consumed in the last several years.

## Logical Level of Imports

We shall be short-sighted indeed if, preoccupied with our own peculiar problems, we fail to keep in mind the impossibility of divorcing the well-being of mining from that of the nation as a whole. More specifically, as producers we cannot prosper if the people who buy and use minerals are in distress. Also, it is generally conceded that as a nation we cannot enjoy good times if the rest of the world suffers from economic depression. Therefore, intelligent self-interest demands that we concern ourselves with the nation's economic problems and lend ourselves to their solution. The same motive also compels us to lend a hand in the solution of world problems.

Considering the national picture, we can hardly escape the fact that virtually all business men and economists who have sought the means of attaining postwar prosperity agree that we cannot sustain a high level of production without much more foreign trade than in any peacetime years. It is also understood that the industries which will be most dependent on export outlets are the capital-goods industries. If we resist efforts to expand trade, and thus succeed in strangling capital goods production, where are we going to market a satisfactory mineral output?

Inasmuch as we shall have a postwar capacity to produce from one and a half to twice as much as we produced in 1940, it is evident that we are going to have either an unprecedented level of peacetime activity or else mass unemployment that will shake the foundations of the private enterprise system. If the latter alternative develops, we shall have problems that will dwarf any concern over imports. If, on the other hand, we enjoy high employment—and the world prosperity necessary thereto—consumer demands are likely to tax the world's developed mineral resources, including our own. In brief, intelligent self-interest demands that our industry should accept part of the burden of increased imports.

However, this does not mean that the mining industry should be sacrificed in behalf of manufacturing interests. These interests must expect to bear their portion of import competition, partly because serious damage to domestic mining will be injurious and dangerous to the country, and partly because it will probably be physically impossible to balance the exports they desire except with a diversified list of imports, including manufactured and agricultural products.

One circumstance which most people fail to take into account is that the rest of the world is hardly prepared to flood our markets with minerals. World production before the war was approximately in balance with consumption. Much of it was artificially subsidized by nations preparing for war or in distress for foreign exchange. Wartime foreign depletion has been much more rapid than development, and much equipment is badly run down. Also, foreign production costs have risen, in many cases more conspicuously than here.

Moreover, foreign national policies may place definite restraints on mineral exports. For example, the British are a farseeing race and will not be anxious to gut the mineral deposits they control in the next few decades, leaving themselves overly dependent on the Western Hemisphere thenceforward. The Russians view minerals as state property and are probably more interested in developing them for their own future use than in dissipating them all over the earth in trade, as we have done, often for nothing but bad debts in return. Most Latin American countries are just as much interested in taxing mineral outgo heavily and in building up their own self-sufficiency as they are in shipping cheap crude minerals to us. China and India are hoping to build up their domestic living standards. If they succeed even partially, they will probably be net importers of minerals on a considerable scale. Therefore, particularly considering reconstruction needs, it seems possible that we may have competition for most of the minerals this country seeks to acquire from abroad.

To summarize, considering the anticipated high level of domestic mineral consumption, it will probably be feasible to maintain our prewar level of domestic mineral production and accept an increased flow of mineral imports as well. A balance on approximately this basis would be wise national policy, correlated with the principle that any indicated changes should be made slowly, in order to avoid hardship in making adjustments.

## Tariff Outlook Puzzling

The one argument in support of tariff that is indisputable is that it bolsters national self-sufficiency. The latter is a safeguard against a national emergency or international conspiracies to make us pay excessive prices.

If we wish to support self-sufficiency—which, throughout our national history, we have always sought to do—then some special protection must be given to several branches of domestic mining. We know that the average grade of foreign ore deposits is much higher than our own; also that no matter what restraints may be placed upon the flow of goods, it is impossible to embargo knowledge. In other words, scientific discoveries, engineering talent, skilled manpower, and modern machinery are and will continue to be available to anyone in the world who has the ambition to acquire them. Therefore, except to the extent that we benefit by superior transportation facilities within this country, the foreign producer, working on richer ores with cheaper labor, enjoys an advantage which we can overtake only by charging another group of Americans, the consumers or taxpayers, for tariff protection or other subsidy devices.

It seems certain that until the fear of war is finally removed and the principle of "equal access to the trade and raw materials of the world" is firmly established, all nations, our own included, will seek to bolster their self-sufficiency. Therefore, as long as moderate charges against consumers or taxpapers will accomplish this, we can expect public support of mineral protectionism. However, it would be illusory to presume that we can enjoy protection ad infinitum or even beyond the point where the cost becomes burdensome.

Apropos the quest for self-sufficiency, it should be kept in mind that our newly adopted policy of stockpiling minerals tends to reduce the need for protection. In other words, to the extent that we meet possible emergency needs by stockpiling, these needs will not require the artificial support of domestic mineral production.

Those branches of the mining industry which depend on tariff protection are in a puzzling dilemma. Their costs have mounted considerably during the war, and it seems likely that much of the increase will be retained. We know that foreign costs have also risen, but in those places most likely to offer us competition, labor is probably not as well organized to protect its gains as is the case here. People who face actual want are not likely to deny themselves sustenance if their employers are not in a position to offer more. Therefore, when competitive trade is resumed, tariff-dependent industries will probably need more tariff protection unless world consumer demands are lively enough to narrow the gap between foreign prices and domestic production costs.

What chance is there of obtaining such additional protection after the war? The national drift for ten years has been toward reducing tariffs. Some minerals have already suffered duty cuts. On every hand people are talking more international trade and abolition of barriers. Unless there is a definite about-face in public thinking, it seems hopeless to plan on tariff increases, or even on retaining present margins of protection. Even if there is an about-face, our status as a creditor nation will scarcely permit us to live with an isolationist philosophy. The most a protectionist can expect under the present outlook is that reductions of tariff will be gradual.

However, a gradually declining margin, or even a static one, fails to meet the needs of protected domestic mine operators. They must not only shoulder higher costs inherited from the war period, but must anticipate constantly mounting costs as depletion of their properties advances. In other words, preservation of the status quo would be a hollow accomplishment. Furthermore, the pressure against tariffs is bound to grow if the nation becomes more and more dependent on imports.

## New Protection Formula Needed

Thus, it seems that some new tariff formula or subsidy device is indicated. To meet the changed national attitude and trade outlook it must reduce the average total of tariff protection. To meet cases where self-sufficiency is declining or already slight, it must avoid adding needless costs to the logical amount of imports; otherwise consumer resistance will be encountered. To meet the widening differential between foreign and domestic production costs, it must afford larger margins of protection.

Although these apparently contradictory objectives are impossible to attain with the type of protection to which we are accustomed, there are alternative routes to their achievement. The most scientific way would be to substitute direct, tax-supported subsidies for mineral duties. Such a system would have the following advantages: (1) It would afford protection to domestic producers without taxing consumers on the imports which flow in anyway. (2) The total burden on trade could be reduced by relieving imports of duty, even through the margin of protection afforded domestic producers were maintained or increased. (3) It would not jack up domestic wages and prices needlessly in comparison to those abroad. To the extent that higher wages are offset by higher prices, the standard of living is not improved, and the dual increase simply throws our economy out of gear with the rest of the world.

Outside of the difficulty of gaining acceptance of any radical departure from established practice, from the producer viewpoint there are two possible disadvantages to abolishing import duties in favor of direct subsidies: (1) Because tariff operates as an "invisible" tax, it is accepted with less resistance than a tax-financed subsidy would probably receive. (2) A direct subsidy would improve the opportunities of social theorists to set up discriminations between beneficiaries.

## Objections to Quotas

Another route by which the objectives mentioned could be reached is through import quotas. These could be used to reduce the duty on a designated rate of importation, thus also lowering the total cost of protection, while maintaining or increasing the barriers to over-quota imports.

With a desire to help the mining industry find a constructive solution to its tariff problems, and to do so before the industry finds itself in new controversies, I have consulted with a number of industry leaders, West and East. At these meetings the direct-subsidy alternative was not discussed, in the belief that such a radical departure from established practice was probably unattainable. The quest was narrowed to searching for a quota system that would be practical and acceptable. As such, it was unsuccessful. Basking in the sunshine of wartime demands, most miners and smelters are not sufficiently worried over their future to get excited over postwar tariff. Also, most smelters have no enthusiasm for an arrangement which would upset the present cost relationships between competitors. Any quota arrangement that prevents smelters and importers from calculating costs in advance is objectionable. This is particularly true if the system involves delayed adjustments to equalize the effect of differential duties. The same objection holds if a reduced concentrate duty is distributed as a domestic subsidy, in an effort to lower average duty but raise the margin of protection afforded to domestic miners and smelters.

Many producers are disinclined to seek a new protection formula. They either do not share my opinion that the status quo will be inadequate, or they seem to think that there will be no great difficulty in securing tariff increases based on what they consider a suitable showing of facts. In my opinion, this confident attitude fails to account for changed public and official viewpoints or the rigidity of official minds. We have had ample opportunity in recent years to observe the tendency of officials to ride out mistakes rather than admit errors.

## Mineral Stockpiles

Stockpiling of minerals, already widely endorsed throughout the mining industry, and approved by Congress, actually has three separate aspects. These are: (1) assurance of adequate supplies for a future emergency; (2) preventing the impact of war-generated surpluses from demoralizing domestic mining; and (3) affording a means of collecting some foreign debts or building up foreign credit through mineral shipments without injuring domestic mining.

The first of these aspects has already been widely discussed and accepted; we would simply add that any logical requirements to meet a future emergency will probably be much larger than most people realize, partly because war's material needs mount constantly and partly because our self-sufficiency will probably be lessened as time passes. We believe that military requirements, properly determined, will pretty much cancel the possibility of industrial demoralization by absorbing most present and potential surpluses. In any event, the right of an industry which has contributed so bountifully toward victory to assurance against being swamped by the fruits of this effort can hardly be questioned. However, we are asking for trouble when we request that any actual surpluses over emergency needs be stockpiled permanently, rather than to be disposed of in judicious and orderly fashion.

As stated above, the expectation is probably fantastic that our willingness to accept mineral imports would cascade a flood in our direction. In any event, if it is possible to collect foreign debts or facilitate desirable trade by importing minerals in excess of current needs, there is no reason why such accumulations should not be stockpiled until domestic markets can absorb them comfortably. Minerals can be stored indefinitely and would certainly be much better security for taxpayers' investments than any promises to pay. However, as Charles Taft. of the State Department, recently stated before the Colorado Mining Association, the acceptance of minerals in payment for debt will not provide foreigners with dollars to purchase American exports.

In case of any government-held surpluses, the industry should stoutly insist that if sold, disposal should be prudent and orderly, and only at such times as markets can comfortably absorb the contributions.

## Mineral Cartels

Nothing could be more illustrative of the confused state of our national economic policies than the current attitude toward cartels. An enormous backlog of public disapproval of cartels is being built up by both officials and private citizens, despite the fact that we shall probably have to live with mineral cartels whether we like them or not. Also, the same government which is crusading violently against cartels enforces cartelization of the domestic coal, petroleum, and agricultural industries, and has only recently entered into an international compact over Near Eastern oil.

It must be admitted that cartelization, properly administered, can contribute both toward industrial stability and toward conservational operations. These have been primary objectives of some mineral cartels and of the petroleum and coal regulations in this country. The difficulty of shutting down or reopening mining properties to meet fluctuating demands causes an inevitable trend toward controlled production and the use of buffer stocks. Undoubtedly the world's minerals could be produced most cheaply over the long pull by stabilized operations. Also, the impact of unemployment in one industry on the markets of another has led to attempts to stabilize employment in general. This trend is so universal that there is little reason to look for it to stop growing. Thus, we have little hope of living in a world without mineral cartels.

The practical alternatives are: shall we drive them beyond our influence by opposition, or shall we by participation try to clean them up and make them serve consumers as well as producers? Mineral cartels will be inevitable if any plans are laid to prevent belligerently inclined nations from accumulating the supplies necessary to make war. Nobody knows at the present time what steps may be taken in this direction.

Without undertaking to defend cartels on principle, we believe that mineral cartels are going to exist and that we would do well to learn how to live with them.

## Improvement of Foreign Policy

The changed attitude toward foreign trade and the accelerated activities of American mining companies in seeking foreign opportunities are assurance that American interests will be more heavily involved in foreign operations than ever in the past. These conditions and official utterances all point to a departure from Uncle Sam's traditional indifference toward the fate of American enterprises in foreign fields. Probably the arbitrary expropriation of American property by foreign governments is a thing of the past. Also, our commercial interests will no longer be left to founder in the face of competition by people whose governments give their trade diplomatic support.

In the exploitation of our own minerals, we have permitted citizens of other countries to enjoy the same rights and privileges as American citizens. Some nations whose people have benefited by these opportunities do not grant Americans the same rights as their own nationals in the development of minerals under their control. Certainly, it is proper for our government to insist on reciprocity in such matters.

The counsel of our mining industry is desirable and will no doubt be welcome in meeting such problems as: prevention of discrimination against American capital in developing foreign mineral deposits or in purchasing foreign minerals; prevention of arbitrary expropriation, excessive taxation, or burdensome regulation of American-owned foreign operations; overcoming foreign exchange handicaps; and improvement of diplomatic and commercial attaché services.

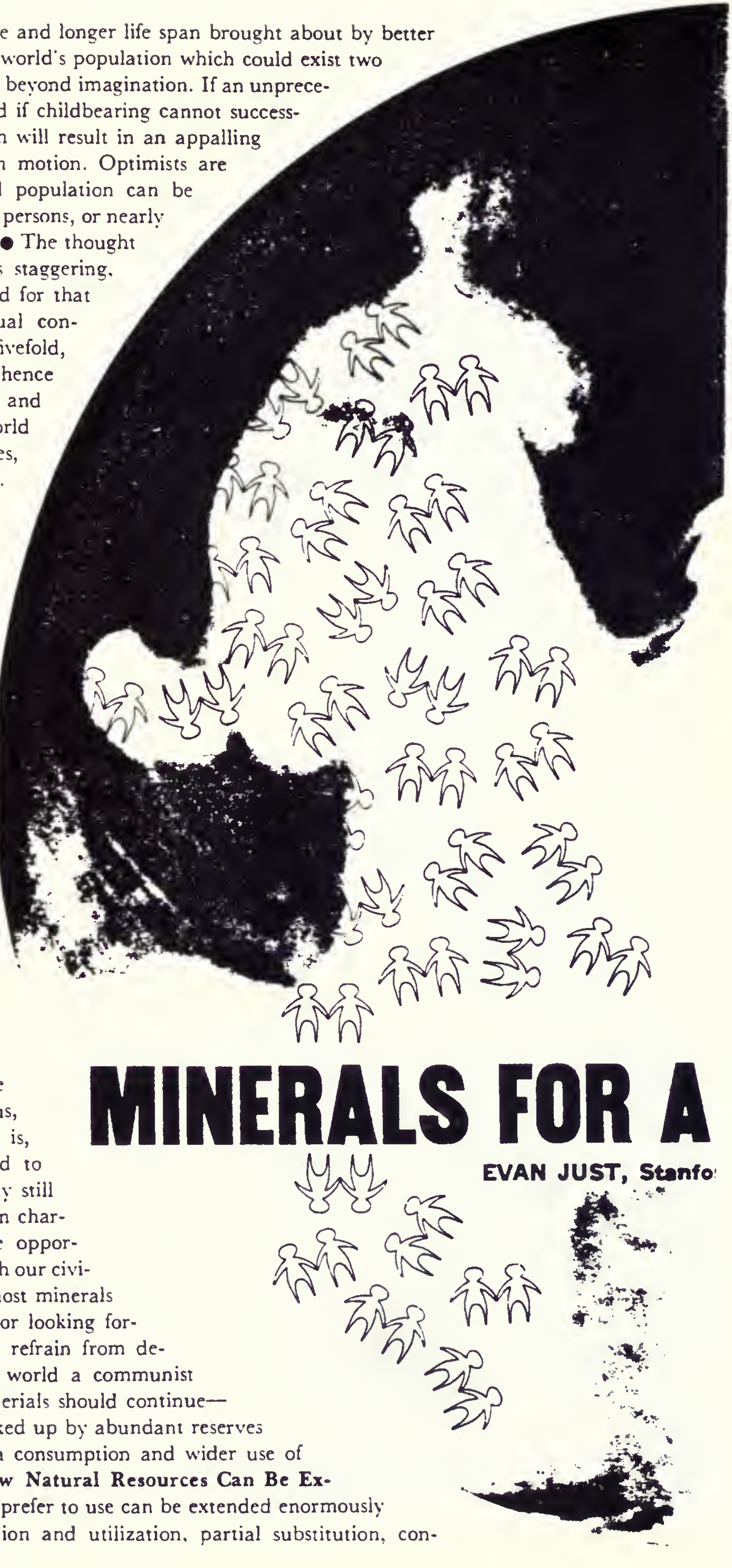
## Mineral Location Rights

There is already widespread concern in the mining industry over the tendency of some officials to restrict mineral location on public lands. Mining men have no clear idea to what extent this movement is based on an honest desire to correct defects in public land policy, or simply cloaks an official desire to hamstring private enterprise in mining. It would be beneficial if some representative committee would study the facts of this situation, and be prepared to take a constructive position on such affairs as the uproar in Alaska over the Interior Department's move to set up large Indian reservations.

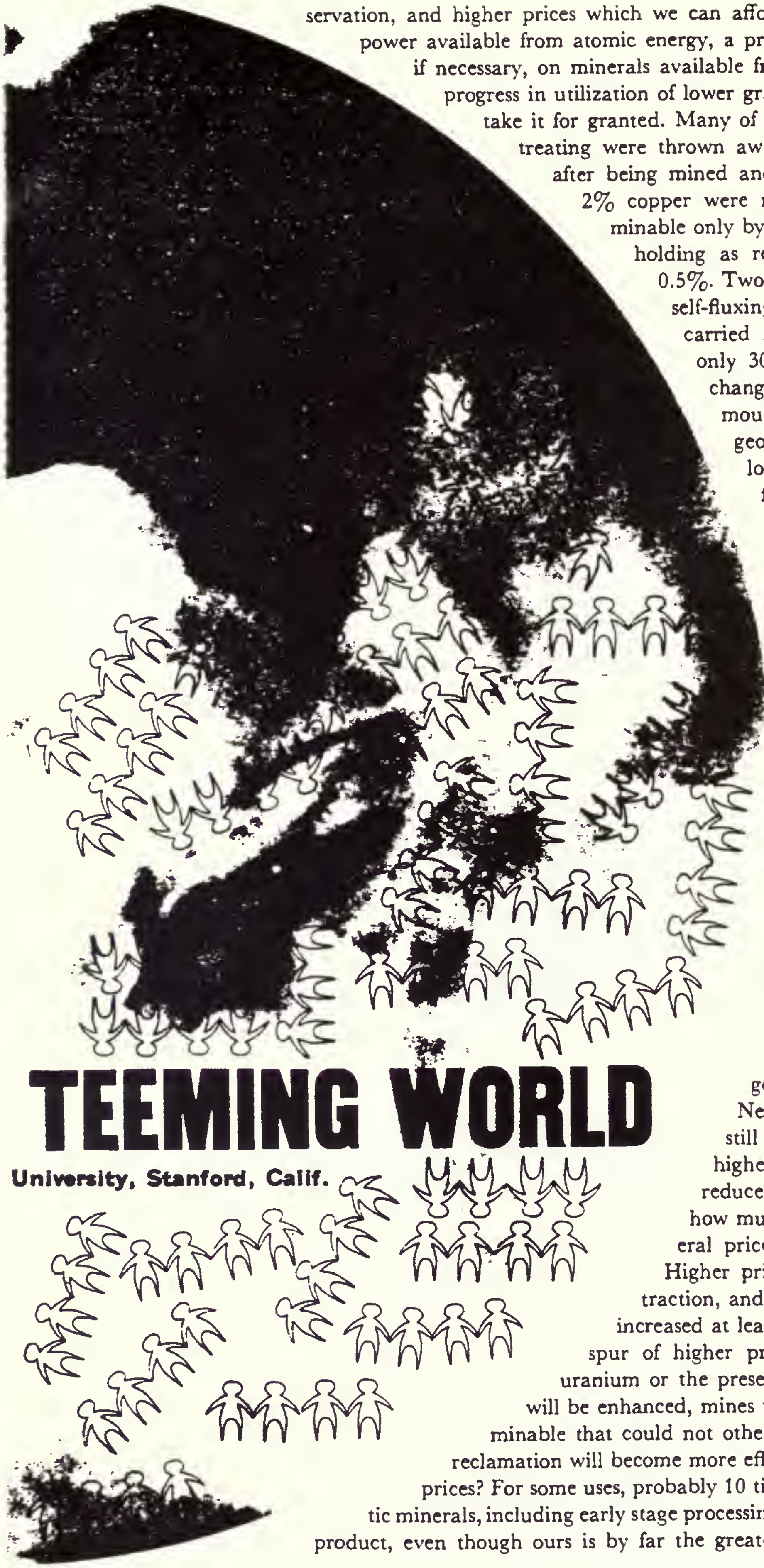
An organized effort to study and improve public land policy would certainly be better than the present situation, whereby each affected segment of the industry fights and usually loses a local rear-guard action against organized and persistent encroachment. Also, the industry would be in a better position to resist if it would take steps toward eliminating abuses of the present system. All collective efforts concerning assessment work have been toward reducing or eliminating this obligation. Under emergency conditions there is some excuse for this, but in its own and the public interest the industry should not continue to make it easy for people who do not intend development to hold claims year after year. Also, the present system has permitted people to pasture livestock or cut timber on public lands while holding them under pretended mineral claims.

# MINERALS FOR A

**EVAN JUST, Stanfo**

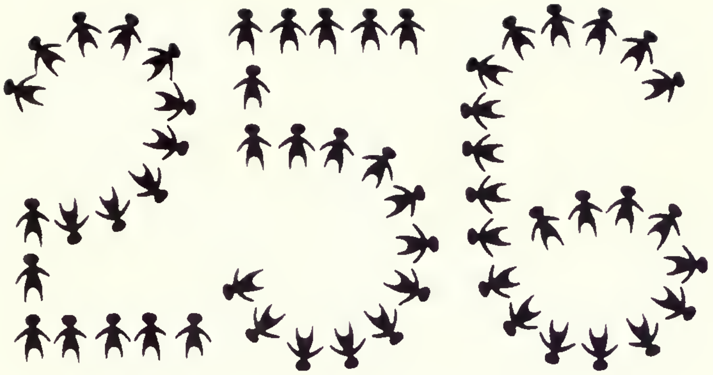


In view of our increased birth rate and longer life span brought about by better sanitation and medical care, the world's population which could exist two or three centuries hence is almost beyond imagination. If an unprecedented catastrophe does not occur and if childbearing cannot successfully be made unpopular, forces which will result in an appalling swarming of humanity are already in motion. Optimists are hoping that in 100 years, the world population can be brought under control at 7 or 8 billion persons, or nearly three times the number existing now. ● The thought alone of that many human beings is staggering, but what of goods and services needed for that many people? The average individual consumption is expected to increase fivefold, which means that the world 100 years hence will consume 15 times as much goods and 20 or 25 times as much energy as the world does today. In terms of mineral resources, this prediction is reason for pause. Depletion of mineral reserves is already taking place, most of which has occurred in the last 50 years. ● Even before the upturn in population was predicted, mineral economists were gloomy because of possible mineral shortages. Our national concern for this problem is reflected by the number of surveys conducted to estimate mineral reserves—in the twenties by the U.S. Geological Survey, in the forties by the Bureau of Mines, and in the fifties by the President's Materials Policy Commission. The Ford Foundation has set up Resources for the Future, an organization devoted to resource studies. ● If such a gloomy viewpoint is entertained, the thought is rather terrifying of what would happen to the ethical standards and conduct of the human race should it be hemmed in by material shortages. Thus, relief from anxiety over this problem is, in a sense, a license to look forward to peaceful progress. Of course, man may still be restrained by deficiencies in his own character, but at least he will have the opportunity to correct these. ● Even though our civilization rests on a mineral base and most minerals are depletable, there is good reason for looking forward to peaceful progress. If we can refrain from destroying civilization and making the world a communist prison, abundance of a variety of materials should continue—slow shifts toward using materials backed up by abundant reserves should appear, with higher per capita consumption and wider use of more complicated technology. ● **How Natural Resources Can Be Extended.** Supplies of those minerals we prefer to use can be extended enormously by technological progress in exploration and utilization, partial substitution, conservation, and higher prices which we can afford to pay. Given the abundance of power available from atomic energy, a progressive society can be maintained, if necessary, on minerals available from common rocks. ● Technological progress in utilization of lower grade ores is so steady that we tend to take it for granted. Many of the materials we are now mining or treating were thrown away as waste a generation ago, even after being mined and partially treated. Ores containing 2% copper were regarded as so low grade as to be minable only by the cheapest methods; today we are holding as reserves ores that will average only 0.5%. Two decades ago, iron ores that were not self-fluxing were regarded as marginal if they carried 50% iron; today, material carrying only 30% is profitable. The effect of such changes on extension of reserves is enormous, because reserves tend to enlarge in geometrical progression as grades are lowered. ● Also, the number of mines found in recent years through highly technical skills is very encouraging. Technical prospecting will do much toward finding mineral deposits that cannot be found by simpler methods, thereby greatly extending the world's mineral reserves. The oil industry has, of course, had its exploration efforts on a highly technical basis for many years, and has continued to produce miraculous results. These have made past estimates of total reserves look ridiculous in retrospect. ● Conservation also has immense potentialities. A good start has been made. For example, most of the copper, lead, and aluminum, and a good share of the iron and iron alloys are reclaimed for future use, sometimes over and over again. In power generation, coal goes much further than formerly. ● Nevertheless, much waste of minerals still occurs. However, as scarcity causes higher prices, waste will be still further reduced. It is interesting to speculate on how much waste would be eliminated if mineral prices were increased five- or tenfold. ● Higher prices will also extend exploration, extraction, and treatment. Reserves probably can be increased at least tenfold by this incentive. Given the spur of higher prices, such as the bonus offered for uranium or the present boom in silver, exploratory efforts will be enhanced, mines will last much longer, deposits will be minable that could not otherwise be touched, and treatment and reclamation will become more effective. ● Can we afford to pay higher prices? For some uses, probably 10 times higher. The entire bill for domestic minerals, including early stage processing, is less than 3% of the gross national product, even though ours is by far the greatest mineral industry on earth. Much



# TEEMING WORLD

**University, Stanford, Calif.**



higher prices would add up to a very small reduction of our leisure time or comfort. But if expressed as less time for television, less speed on the highways, or less gaudy living, then such reduction could even be a boon instead of a handicap. Also, if minerals sold for 10 times as much, they would be so reclaimable that we would, in effect, be renting rather than buying them.

Substitution of one material for another has progressed to the point where probably not a single mineral exists whose disappearance would handicap civilized progress importantly. There are certain substances such as water, oxygen, calcium, carbon, salt, nitrogen, phosphorus, potash, and silicon, which are necessary for physiological purposes, but all of these are available in such superabundance that there is no danger of shortage. The same can be said of the nutrient trace elements, if supplies are related to actual needs.

If the powerful resource-extending influences mentioned thus far are not a complete solution to future mineral needs, then a combination of technical progress and substitution provides a final answer. Given enough energy, a progressive civilization can be maintained on the minerals from the common rocks and the ocean. From these sources we can obtain limitless supplies of aluminum, calcium, carbon, chlorine, hydrogen, iron, magnesium, phosphorus, potash, silicon, sodium, and sulfur. Add nitrogen from the atmosphere and oxygen and water from various sources, and everything else becomes a convenience rather than a necessity.

These substances may not be adequate for jet propulsion or 80-story buildings, but little evidence exists showing such are necessary to progressive, cultured civilization. Moreover, the end is still not in view for relatively scarce materials as copper, lead, zinc, nickel, cobalt, silver, mercury, tungsten, gold, molybdenum, and titanium, unless limitations are foreseen for prices, feasibility of reclamation, and new discoveries. With the abundant materials available to carry the major loads, an end to supplies of these less abundant materials is unlikely. Thus, it is probably unrealistic to suggest that posterity will have to do without jet propulsion and tall buildings if it chooses to have them.

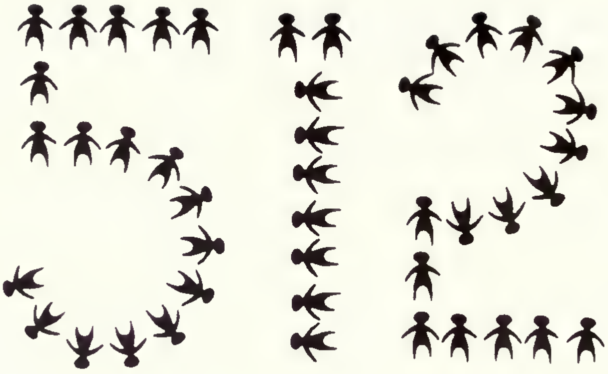
### The Importance of Power

The key to this continued outpouring of mineral abundance is large amounts of energy. A recent report by King Hubbert to the National Academy of Sciences and the National Research Council contains the following:

—In terms of the energy needs of a teeming world, human, animal, and falling water power potentials are insignificantly small
—Reserves of the fossil fuels would last only a few decades at the rate needed by such a world. Also, an increased rate of combustion might have dangerous ecological consequences
—The theoretical potentials of solar radiation are enormous, but, although we cannot ignore the possibility of a scientific breakthrough, high capital costs and inefficiency will probably restrict its uses
—The energy potential from available uranium and thorium is sufficient for thousands of years
—When a means can be devised for generating power from hydrogen fusion, the energy potential from this source will dwarf all others except that of solar radiation

Probably the most important achievement to support confidence in future mineral abundance is progress made in the difficult task of harnessing hydrogen fusion. Also, the existence of large masses of granite containing recoverable

**New techniques for locating mineral reserves will be developed. These geysers of mud and water resulted when the technique developed some years ago, called pattern**



thorium has been confirmed. Dredging of the ocean bottom has disclosed vast quantities of phosphates, manganese, copper, and cobalt thinly spread as nodules over large areas. Development of the fuel cell makes us less dependent on lead or nickel for storage batteries. Work on desalination of ocean water makes it clear that water supplies can be drawn from the ocean when necessary. Progress in direct reduction of iron is moving toward making the steel industry less dependent on coking coal. Also, manufacturing of coke from lignite looms up as an alternative. Development of automation and computer sciences makes much more human energy available for raw material procurement, should this be necessary.

With these added assurances and the continuation of ingenuity and technical progress, mineral shortages should not limit either the progress or the numbers of the future human race.

### Minerals and Economic Power

To say that minerals will not limit the future of the race does not mean that they will not continue to present problems or play an important part in shaping the future. For example, what about minerals and economic power? Throughout history, minerals have been important in human affairs, both in their direct impact on economic and military power and as strategic objectives in national planning. The privilege of major economic status has been accorded to those areas which have had the resources to support important steelmaking centers. Only Japan has been exempt from this tyranny of mineral distribution, but Japan was able to control resources on the Asiatic mainland while building up its status as a steelmaking country.

However, as hydrocarbon fuels decline in the future as principal sources of energy, there seems to be no fundamental reason why the dominance of the coal-iron heartlands must continue. For a long time, areas particularly well endowed with coal will probably have an advantage in terms of energy costs. But the principal advantages of the present major industrial powers will probably be their enjoyment of capital strength, know-how, and populous areas capable of offering attractive markets. These advantages are likely to persist for a very long time, unless some form of moral degeneration develops to counteract them. Degeneration has always been more of a hazard to the privileged than to the less privileged.

We should regard as keystones of future national greatness the fostering of good education, capital accumulation, and respect for excellence. This gives us cause for concern, because in this "century of the common man" our production of technologists is insufficient for future greatness; thrift is regarded almost as a vice; and the concern of political, union, and sociological leaders is mainly for the non-excellent. Also, much of our educational system is a mess, and we continue to defy both nature and common sense by breeding most of every new generation from the less capable portion of the population.

As for military power, in modern times eminence has been linked to mineral supplies and industrial strength. Much of our strategic planning has been concerned with these vital props to effective military action. However, the expectation that victory in war will be decided by quick offensive power rather than by a long struggle has detracted from the importance of minerals in the minds of our military planners. This is indicated by cutbacks in stockpile goals. Minerals are still viewed as the

**shooting, was used for locating new oil reserves. Shock waves from detonation of underground explosives are bounced from deep-lying rock layers and are recorded**

sinews of war, both for explosives and equipment, but not in the same massive sense that has prevailed in recent decades.

### Texture of the Mining Industry

As civilization depends more and more on common materials, mineral-producing sites will tend to become more evenly distributed. Moreover, countries of reasonable size, say that of the United States, will gradually become more self-sufficient and, eventually, totally so. Also, the growing dominance of open-pit mining will continue, as most common minerals occur in abundance at shallow depths. One might readily conclude that, as dependence grows on deposits that are easy to find, mining profits will diminish, on the assumption that one site will be approximately as good as another. However, this is doubtful. The profits of leading mining companies seem to bear little relation to the value of resources being depleted.

The complexion of the mineral industry will change profoundly as depletion overtakes the fossil fuels. Presently the fuel industries account for approximately two thirds of the value of minerals produced. Numbers of employed personnel are in about the same ratio. Thus, the parts that will survive over the longer-term future now represent only one third of the mineral industry. On the other hand, if energy generation becomes mainly dependent on low-grade uranium and thorium reserves, the extraction of these materials will call for large mining operations.

This is not to say that the oil and coal industries will become extinct, at least for many decades. The oil industry has such impressive talents and strength that it will continue to disappoint its prophets of doom for a long time, and will turn to other raw materials as depletion makes oil and gas more costly. Coal will probably be a competitor in power generation and chemicals for many decades. Atomic energy has poor prospects as a competitor to hydrocarbons in the field of power for small vehicles.

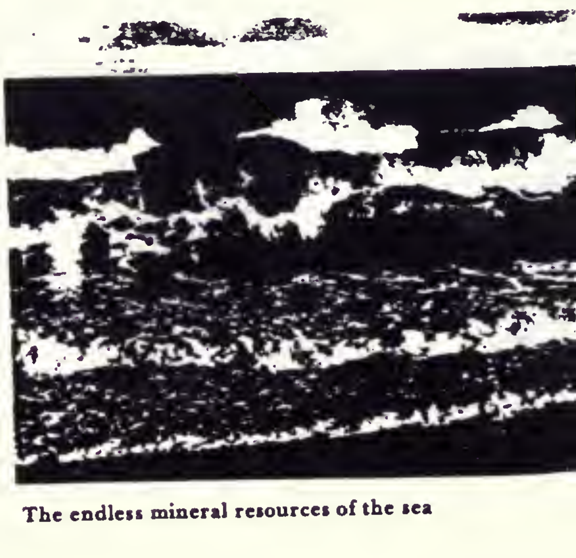
Growing population and urbanization will bring many problems of living space to the mineral industry. Already urbanization is an overwhelming competitor for land, as are numerous restraints that nature lovers and sportsmen are trying to place on wilderness areas. By and large, urbanized areas will not tolerate establishment of new mineral enterprises locally. Even in a society dependent on common materials, there are going to be important differences between deposits, and the competition with urbanization will be more serious and broader than today.

Probably the foregoing remarks make geologists, geophysicists, and mining engineers wonder what future the shape of things to come holds for them. Some are already saying that research for massive common deposits will not need specialized exploration personnel, and that any kind of engineer will suffice for open pits. Nothing could be further from the truth.

First of all, the long range developments will not happen because of preference, but because a teeming world will be required to undertake them. They will be long in coming because influences mentioned previously will extend supplies of minerals classed as relatively scarce. Also, even though the scarcer minerals will represent smaller and smaller fractions of the total economy, they will be demanded in substantial amounts for a longer time than one can visualize. For particular purposes they perform better than anything else. Beyond this simple usefulness, who can guess what prices

## *Natural resources that can be exploi*

**Sand dunes which can be stabilized by oil spraying a thus made productive**

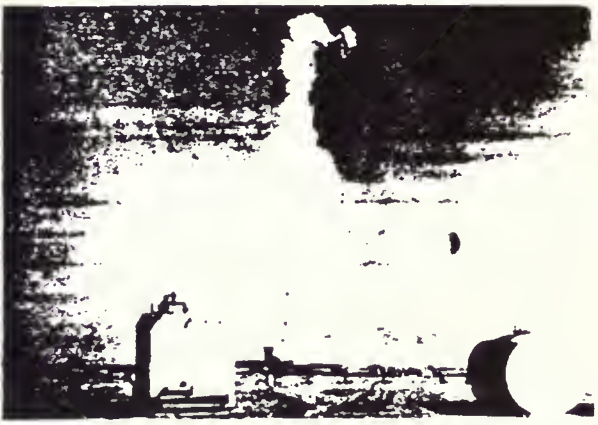


**The endless mineral resources of the sea**

consumers will pay for premium quality? Plenty of people are paying $5000 or $6000 for grossly overpowered automobiles and the extra gasoline to run them, even though quite adequate vehicles can be had for half the prices and operating costs.

Furthermore, common deposits are likely to be large, and the total leverage of small differences in grade, by-products, and location is likely to be important. Selection of those least vulnerable to competition will certainly require detailed field work that will tax the capabilities of the exploration fraternity. As for the production side, there will be plenty of problems of scale, technology, economy, and management to call for the best talents available for this particular purpose. Operating in urbanized areas will bring new problems. The use of explosives may be proscribed, pollution and noise will be unwelcome, and who can say what shape waste disposition will take? Perhaps what we now call wastes will be in demand as construction materials or soil conditioners.

*or the benefit of future generations*



Oil and gas reserves now going to waste by fires out of control

Vast oil reserves in the Colorado shale country

### The Future for Less Developed Countries

What will these changes mean for less developed countries? First, that the benefit expected from deferring mineral exploitation may never be realized. Second, that some of their fears of domination from outside can be forgotten as the mineral incentive toward empire building is lessened by the prospect of more general self-sufficiency. Third, reduction of the monopoly on industrial development imposed by coal-iron distribution will offer better opportunities for industrial growth.

However, problems of development are much more difficult than is generally realized, and the less developed countries are likely to find themselves faced with handicaps 50 years hence that they now expect to resolve in 10 or 20. Know-how is hard to absorb, local customs often retard technical progress and investment, and foreign capital is not likely to flow into areas where menacing political philosophies are cherished. Too few people realize the importance of capital formation and encouragement of investment.

Capital is formed only out of savings, which can be voluntary or forced, but experience to date has little to offer in defense of forced savings. Moreover, saving is much easier for people of a prosperous, developed economy than for citizens who are preoccupied with simply keeping alive. In short, the people of the developed areas have a tremendous advantage which is likely to persist for a long time.

### Minerals Supplies Are Adequate

Civilization need not fear mineral shortages as curbs on future progress or multiplication. Mineral technologists need not worry over disappearance of their functions. The broad nature of the mineral industry will change only very slowly. The tyranny which minerals have exercised over human affairs will probably give way to a tyranny of capital strength and know-how. In general, man has little to fear but man himself!

*EVAN JUST, professor of mining and executive head of the department of mineral engineering of Stanford University, received a B.S. degree from Northwestern University in 1922 and an M.S. degree in geology from the University of Wisconsin in 1925. He has worked in 11 countries, speaks four languages, and in 1954 received an honorary doctorate in engineering from the Montana School of Mines.*

# EDITORIAL

## The Quest for Buried Resources

Since the days of the infamous Blackbeard and Morgan, men have been lured to the Spanish Main to search for the real or fabled treasures the pirates buried on those sandy shores. Few have been rewarded with even a single doubloon.

Today Weyerhaeuser Company is engaged in another kind of treasure hunt, not for iron-bound sea chests brimming with jewels and coins, but for the mineral treasures which may lie hidden beneath the surface of the company's vast timberlands.

Dr. Evan Just, recently retired head of the department of mineral engineering at Stanford University, is helping Weyerhaeuser in its search for potentially profitable mineral deposits. Dr. Just is a widely recognized geologist and mining engineer who has been successfully engaged in this kind of work throughout the world for more than four decades. He is an expert in all methods of mineral exploration including highly sophisticated electronic techniques capable of yielding data on rocks lying hundreds of feet below the forest floor.

But gathering geological data is only the first step in developing a profitable mining venture. This data must be analyzed and interpreted. If the results are encouraging then market values of the product must be studied and projected into the future and weighed against the costs of development and operation. Even after careful deliberation the venture may still be something of a gamble. To reduce the risk as much as possible the company will rely heavily on Dr. Just's experience and judgment.

The search for mineral deposits is a logical extension of Weyerhaeuser's long-standing policy of wise management and multiple use of its natural resources, a policy which for years has added to the profit of the company's operations. In keeping with this philosophy the company is now accelerating its investigation of what lies beneath the roots of the trees. The article beginning on page four explains in greater detail the current status of this project. It is much too early to draw any definite conclusions — Dr. Just is still gathering and interpreting field data — but results thus far have been encouraging enough to warrant continued studies.

If important commercial mineral deposits are found on Weyerhaeuser land the company will give serious consideration to exploiting them. The primary motive is, of course, profitable utilization of natural resources. But there is another reason why the company should develop whatever mineral wealth exists on its timberlands. As the nation's population expands, so must our search for additional raw materials expand. As the world population increases there will be increasing demand for raw materials, many of which the United States presently obtains from foreign suppliers. These sources may not always be available to us. They may become depleted or unavailable through shifts in political alliances. In order to maintain our present high standard of living new natural resources must be discovered and put to efficient use. Weyerhaeuser Company has been a leader in the wise use of its trees. It is now very seriously looking at the rocks underlying its widespread lands.

Prospecting the 3.7 million acres owned by the company is a big job. It may take years to evaluate these buried resources. But in this exploration Dr. Evan Just and the men in timberlands intend to leave no stone unturned.

(Reprint from *Weyerhaeuser News*, November 1966)

## Weyerhaeuser Company retains an expert to direct its...

# PROBE BENEATH THE SURFACE

"The earth gives up its secrets reluctantly. It takes a lot of prying and poking to learn what mineral resources of economic worth may exist on lands as extensive and varied as those owned by Weyerhaeuser Company. But we are making headway."

Thus speaks Dr. Evan Just, geologist and mining engineer who, as consultant to the timberlands division, is undertaking to find and evaluate mineral deposits on the company's holdings, particularly in Washington and Oregon.

Dr. Just is a soft-spoken six-foot-three. At 65 he is still capable of tramping 30 miles a day through Washington's rugged Cascades. Since his graduation from Northwestern and Wisconsin Universities he has held a wide variety of positions in the mineral industries. He was a vice president of Cyprus Mines Corporation, the chief editor of Engineering and Mining Journal, an executive with the government's Economic Cooperation Administration and a consultant working out of New York and Palo Alto. In September he retired from the faculty of Stanford as head of the department of mineral engineering.

In January of 1966 Weyerhaeuser Company retained Dr. Just to carry forward a survey of the mineral potentials of its forestlands, particularly those in the Pacific Northwest. This is part of an over-all program begun some years ago to make the most profitable use of the company's widespread land holdings. The project is presently under the leadership of Harry Morgan, vice president of timberlands.

Like many other geologists and mining engineers, Just has had a varied and adventurous career searching for and investigating mineral deposits in far-flung places, including Peru, Venezuela, Brazil, USSR, Turkey, Morocco, Ireland and many other areas in both North and South America. He has drilled for bauxite near Russia's Arctic Circle, for oil in Oklahoma and Michigan, for lead in Missouri and copper in Quebec. He has searched for mines in the high Andes, in the rain forests of Venezuela and Sierra Leone, in the deserts of Morocco and Brazil, and in many places in Canada's wild hinterlands. As a government official he played a key part in getting production going in Jamaican bauxite, African diamonds, Congolese manganese and Algerian lead-zinc. At various intervening times he has instructed in geology, mineral engineering or mineral economics at New Mexico School of Mines, Northwestern, Lehigh and Columbia Universities as well as Stanford, where he has taught for the past seven years.

"At the moment the most certain deposits on Weyerhaeuser lands are sand and gravel," Dr. Just says. Although less exciting than oil and metals, sand and gravel, along with cement and stone, rank with iron ore and copper in dollar value of production. Sand and gravel is Washington's largest mineral industry. "There are also coal deposits, but expensively mined coal isn't worth much in an area like the Northwest with its abundant hydro power and future expectations of low cost atomic energy."

Since he was retained by Weyerhaeuser last January Dr. Just has checked into many potential deposits on company land. These include bauxite, alunite, mercury and rock suitable for road metal and ballast.

"Oil or gas or both will probably be found on Weyerhaeuser land," predicts Dr. Just. "Right now, however, we are interested in a copper prospect on one of the company's tree farms in Washington."

The possibility of a commercial copper deposit in this area was first indicated two years ago when chemical analyses of the stream sediments showed an unusually high content of the metal. This summer Dr. Just, by geological field work, has narrowed down the probable source of the copper.

This appears to be a cupola, the geologic name given to a domed projection of granite-like intrusive rock. The copper-bearing mineral is chalcopyrite, one of the more common sulfides. It appears to occur here, not in veins, but dispersed throughout the granite mass. Such low grade deposits, known as "porphyry coppers," are, when occurring on a large scale, the principal sources of the metal in the Western Hemisphere.

Mining such deposits requires huge machinery since great tonnages must be handled in order to make the operation of low grade mines profitable. Dr. Just and a team of geophysicists gathered data this summer which will indicate whether or not drilling is warranted on this property. By means of a technique known as induced polarization the percentage of electrically conductive minerals and the size of the mineral-bearing rock mass can be estimated. However, although the method is effective to depths of 1,000 feet below the surface, it cannot distinguish between worthless and valuable conductive minerals; this must be determined by drilling and analysis.

"Even if all investigations indicate a large copper deposit, and even if it should prove to be of high grade, there may be other factors which would discourage development of a mine on the property," cautions Dr. Just. "You've got to balance the cost of stripping off overburden or driving underground workings, buying mining equipment, mining and concentrating the ore, disposing of waste, shipping the ore to refining and smelting facilities, etc., against the market value of copper production. In the exploration stage, it's still a gamble. Mineral exploration nearly always is."

The company's sand and gravel deposits present a similar challenge. This material carries a very low unit value so transportation costs can be crucial. A few extra miles of trucking to the consumer can substantially reduce or eliminate the profits. Thus, before sand and gravel on company lands can be mined it is necessary to know where the material will be needed and what competition the company may expect for a period of several years in the future. The best of Weyerhaeuser's sand and gravel deposits are so far away from Seattle and Tacoma that these population centers will have to show strong promise of expanding considerably before the company can justify the commercial development of these resources.

Even if the copper deposit under investigation should become a profitable mine and the sand and gravel deposits prove to be financially sound enterprises, Weyerhaeuser's interest in developing its mineral resources will not stop there. Company executives are well aware that it makes good sense — good dollars and cents — to know what, if any, valuable mineral deposits underlie the vast Weyerhaeuser timberlands. This is why they have retained a highly respected expert in this field.

This winter Dr. Just will continue his review of the geological literature, his evaluation of field results and his interpretation of geophysical data obtained during the past months. And next summer he will be out tramping the woods again, mapping the rocks and collecting samples. This is a big job; it calls for a tough man who is willing to spend weeks trudging across miles of rocky terrain. Dr. Evan Just is that man, and as with other geologists, much of what he learns comes through the soles of his boots.

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Eleanor Herz Swent

Born in Lead, South Dakota, where her father became chief metallurgist for the Homestake Mining Company. Her mother was a high school geology teacher before marriage.

Attended schools in Lead, South Dakota. Dana Hall School, and Wellesley College, Wellesley, Massachusetts. Phi Beta Kappa. M.A. in English, University of Denver. Assistant to the President, Elmira College, New York. Married to Langan Waterman Swent, mining engineer.

Since marriage has lived in Tayoltita, Durango, Mexico; Lead, South Dakota; Grants, New Mexico; Piedmont, California.

Teacher of English as a Second Language to adults in the Oakland, California public schools. Author of an independent oral history project, Newcomers to the East Bay, interviews with Asian refugees and immigrants. Oral historian for the Oakland Neighborhood History Project.

Interviewer, Regional Oral History Office since 1985, specializing in mining history.